Telephone

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ENGINEER and MANAGEMENT

JULY 1947

Featuring

TELEPHONE ENGINEER NEWSLETTER
Page 17

•

TOLL SWITCHING PLAN FOR NATIONWIDE TOLL DIALING

•

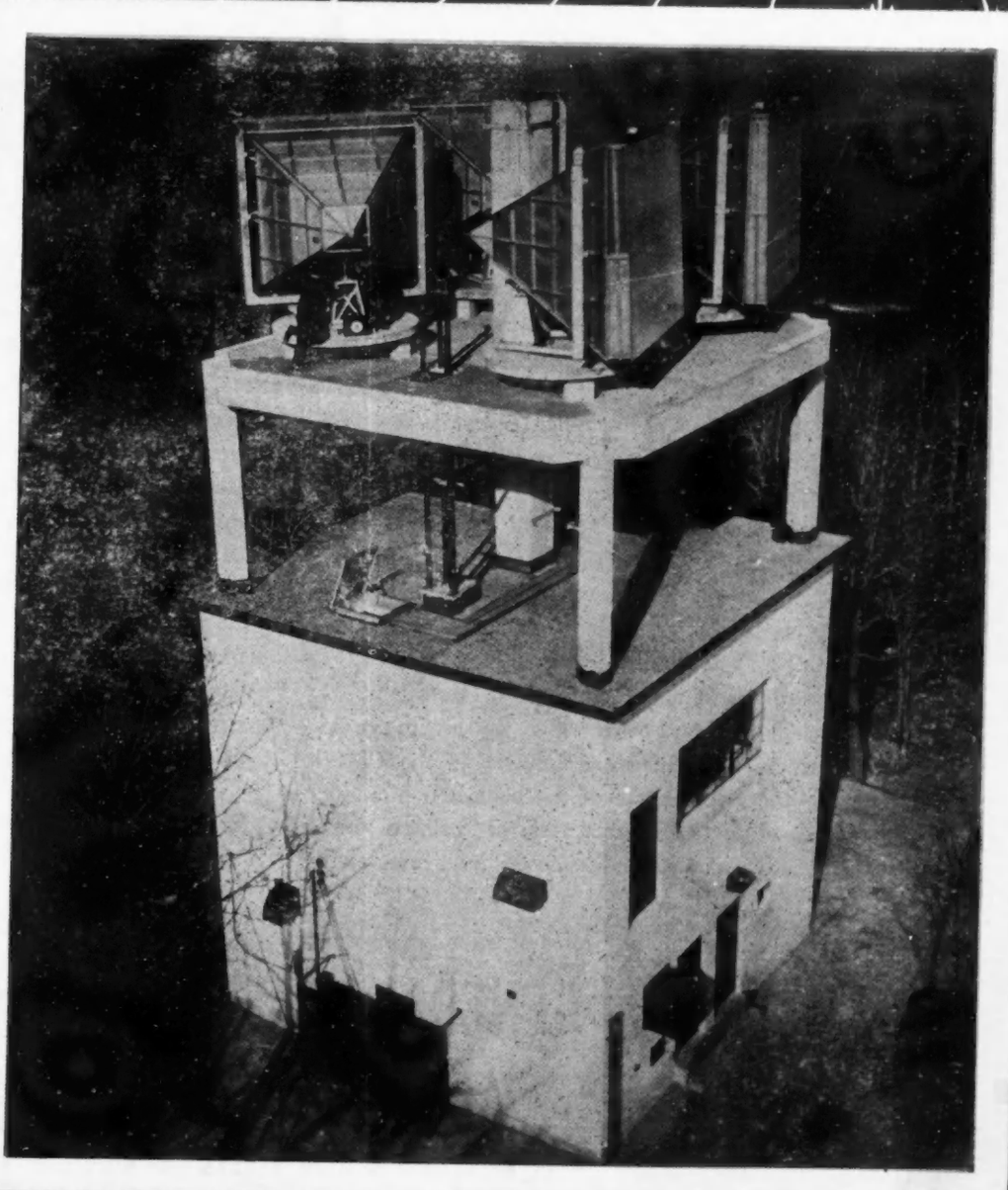
EFFECTIVE TRAINING PROGRAMS
By Elizabeth Dull

•

MODERN TESTING INSTRUMENTS
By B. C. Burden

•

Editorial on Page 20



The Cover Picture —
...towers on seven hilltops. Built ... System, they will provide ... kind of Long Distance communi... Each hilltop tower is a relay ... between New York and Boston ... very short radio waves. These ... waves" are free from static ... most man-made interference.

TWO RIVERS, Wisconsin

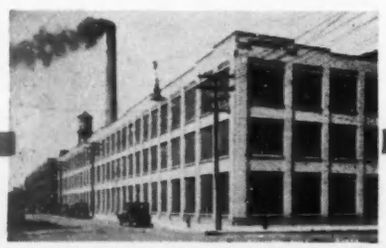
This colorful Wisconsin City is situated at the confluence of two rivers, on a point of land jutting out 7 miles into Lake Michigan. It is boldly marked by the historic Government lighthouse which stands immediately off Two Rivers Point.

In the summer Two Rivers is the coolest spot in Wisconsin, the average temperature for July and August being 71 degrees. Two Rivers offers as an added attraction to summer visitors facilities for almost any form of recreation. At the peak of the summer season comes the Annual Legion Snow Festival when a huge ice palace is erected and the event is highlighted by a snow fight.

Even with these many attractions Two Rivers is not primarily a resort town. It is the birthplace of the aluminum manufacturing industry in the United States, and it is the home of the Hamilton Manufacturing Company, manufacturers of printers office furniture. This renowned concern was founded by J. E. Hamilton who started the business by cutting wooden type by hand. The founder of this huge firm was the donor of the Hamilton Community House which includes an auditorium, gymnasium, bowling alleys, billiard room, kitchen and meeting rooms.

The Commonwealth Telephone Company, which serves the Two Rivers area, employs the complete directory publishing services of our specialized organization. By so doing, this Telephone Company demonstrates its confidence in our ability to produce accurate and modern directories, thereby assisting in the maintenance of favorable relations with its telephone subscribers.

We are proud to state that we believe the Commonwealth Telephone Company, as well as the Telephone Companies in the more than 1000 other communities we serve, will agree that the performance of our trained representatives has always been deserving of that confidence.



GENERAL TELEPHONE DIRECTORY COMPAN

EASTERN OFFICE: 185 NORTH WABASH AVENUE, CHICAGO 1, ILLINOIS, TELEPHONE STATE 547
WESTERN OFFICE: PRESS-TELEGRAM BUILDING, LONG BEACH 12, CALIFORNIA, TELEPHONE 672-2

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10 YEARS AGO THIS MONTH

Alaska picked up the telephone and talked to her Uncle Sam

On July 8, 1937, telephone communication was established for the first time between Alaska and the United States. Immediately the voice of Alaska was brought within speaking distance of tens of millions of other telephone users throughout the world. During this same year, transoceanic telephone service spread out from the United States to China, Bulgaria, Haiti and Iraq.

Like progress was being made at home. America's fourth transcontinental telephone line was placed in service. New developments were coming out of the laboratories and being applied by telephone workers in every state. The telephone Spirit of Service marched onward, maintaining its tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, Exide Batteries have been proving themselves worthy of that trust.

Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

IT SEEMS TO US

This July weather brings the good old smell of mother earth wafting thru open windows creating the desire to get out into the wide open spaces. Maybe we should get a job with the USITA and then retire to the old home town where we could putter around with farm life in our odd moments as did LOUIE PITCHER and BERNIE BURDEN, two USITA execs.

• • •

Maybe there is something to the many extravagant claims of Californians after all. MAURICE MANDLE, Uncle Sam's letter carrier who delivered the mail to TELEPHONE ENGINEER'S offices for many years moved to Oakland some two years ago . . . and this morning his successor brought a letter from "Morrie" describing the fishing wonders of Sacramento River and including a picture of him holding two Striped Bass weighing 16 and 18 lbs. . . . and me so proud of four perch I caught on the 4th.

• • •

Who's working for Who department:—Letter from our Washington editor ROLAND DAVIES to JOHN REYNOLDS our managing editor stated:—"I just wanted to congratulate you on the appearance and make-up of the June TELEPHONE ENGINEER AND MANAGEMENT. . . . You have improved the magazine just 100% and it rates among the most readable industry publications in the country. . . . . My sincere congratulations. . . ."

• • •

Congratulations to B. I. NOBLE on his recent appointment to post of assistant vice president and general manager of Lincoln (Neb.) T. & T. Co.

Mr. Noble's career during his 16 years in the telephone business has been distinguished by his ability and industry. His term of executive service with the army signal corps, where he served as a Lt. Colonel with Omar Bradley's 12th Army Group, further qualifies him for the duties and responsibilities of his new position. Recent promotion will please his many friends, who have watched his progress since 1927.

The National Telephone Magazine

VOL. 51 NO. 7

TELEPHONE ENGINEER and MANAGEMENT

SINCE 1909

Editor
RAY W. SMITH

Managing Editor
JOHN G. REYNOLDS

Associate Editor
JAY G. MITCHELL

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JULY, 1947

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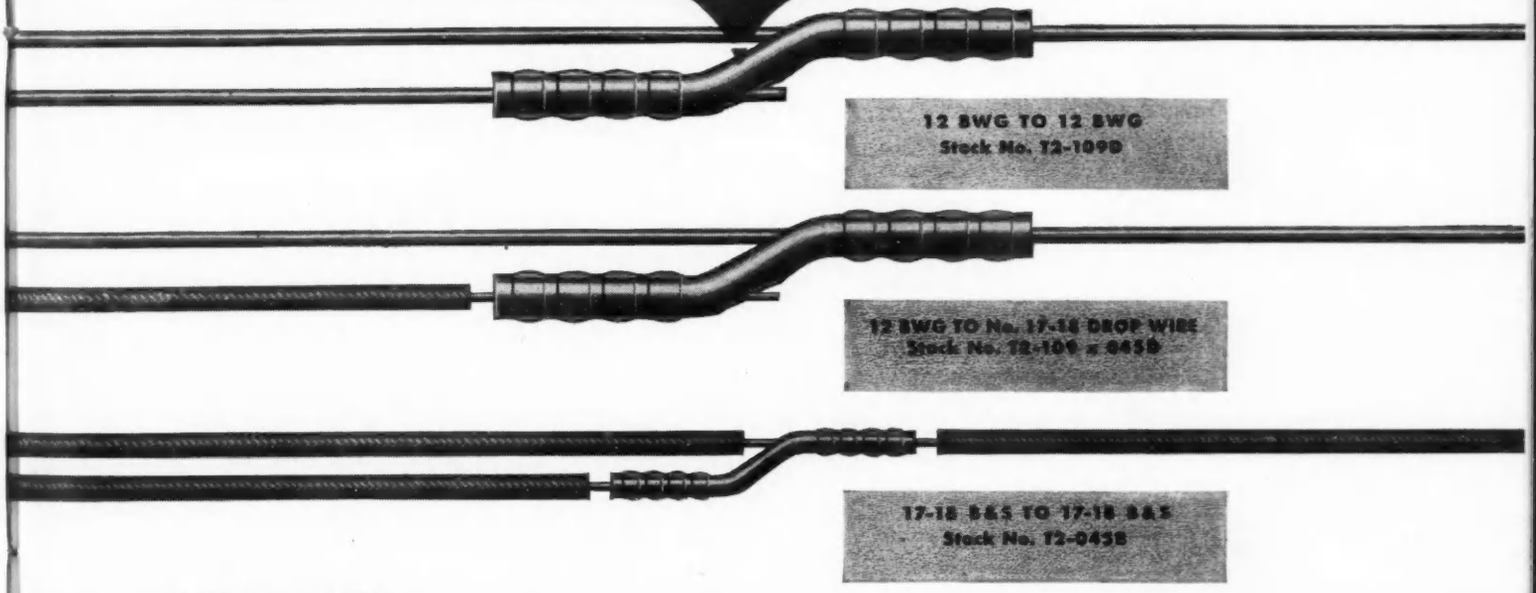
Nicotap

THE FAST, DEPENDABLE Nicopress WAY OF MAKING LINE AND DROP WIRE TAPS

THE NICO-TAP IS SPLIT

THERE IS NO NEED OF CUTTING THE LINE TO MAKE THE CONNECTION—JUST SLIP THE SLEEVE OVER THE LINE WIRE AND COMPRESS



12 BWG TO 12 BWG
Stock No. T2-1090

12 BWG TO No. 17-18 DROP WIRE
Stock No. T2-109 x 045D

17-18 B&S TO 17-18 B&S
Stock No. T2-045B

Ask Your Jobber

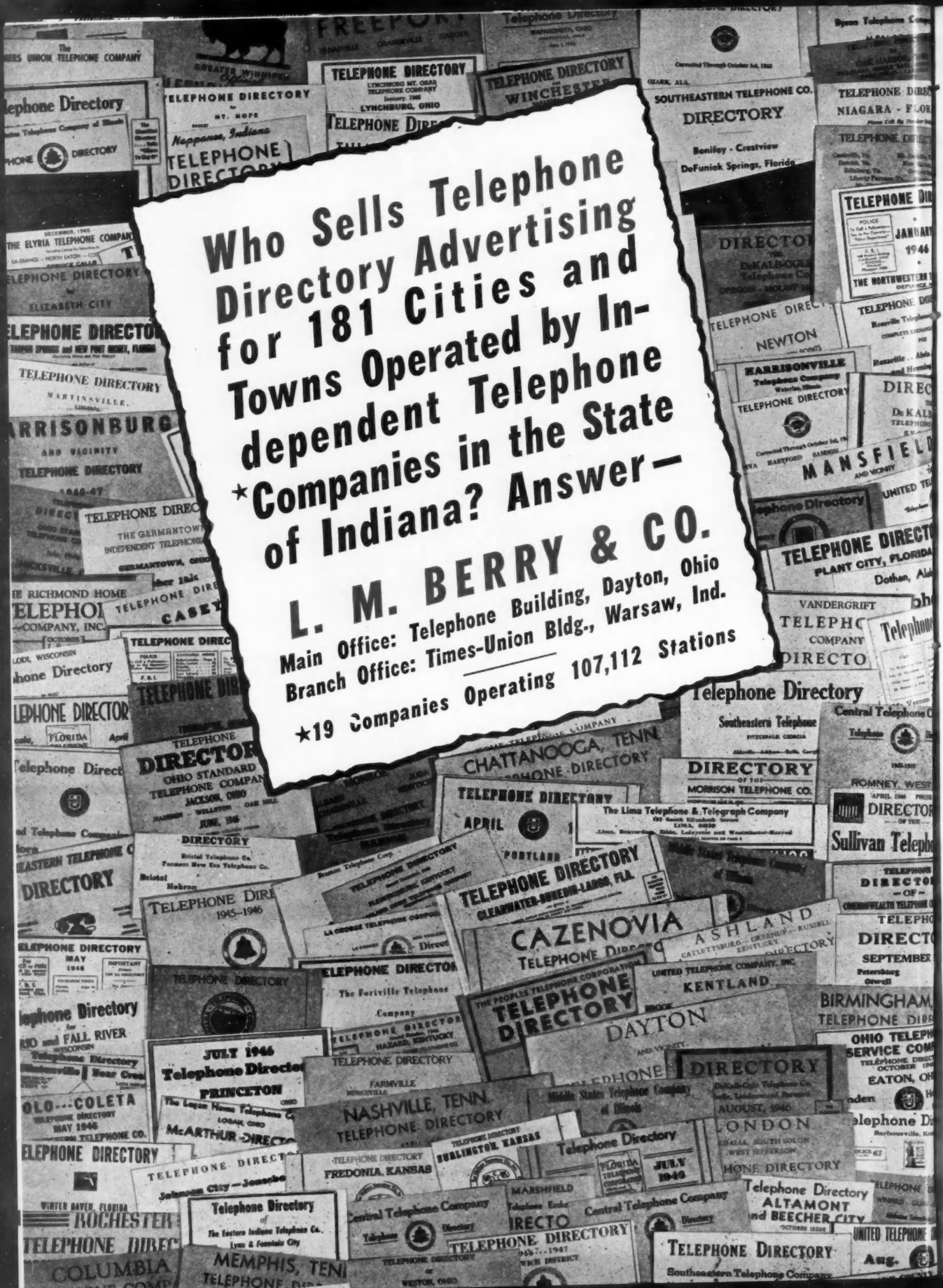
The National Telephone Supply Company

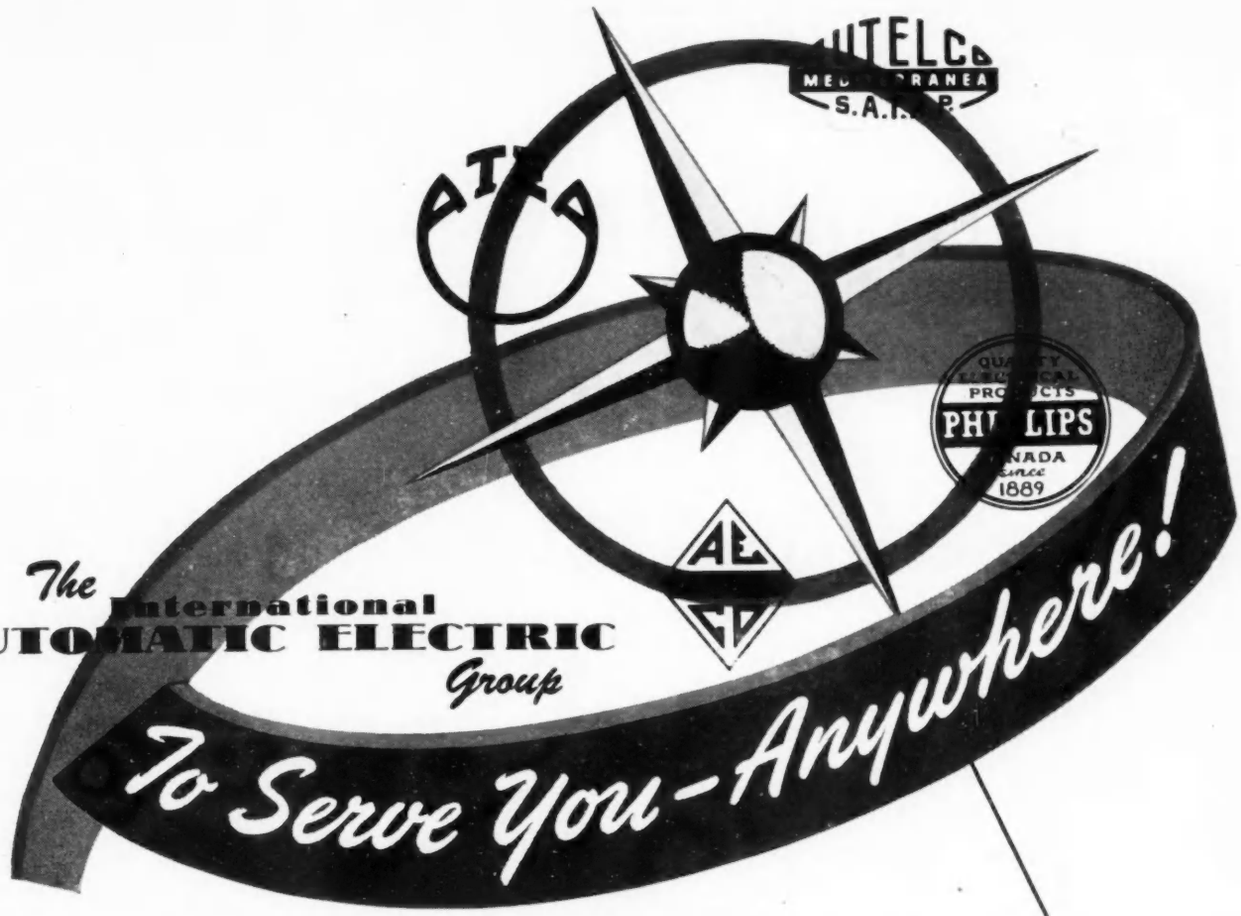
5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY


Who Sells Telephone Directory Advertising for 181 Cities and Towns Operated by Independent Telephone *Companies in the State of Indiana? Answer—
L. M. BERRY & CO.
Main Office: Telephone Building, Dayton, Ohio
Branch Office: Times-Union Bldg., Warsaw, Ind.
*19 Companies Operating 107,112 Stations



From the factories of Automatic Electric Company and its affiliated manufacturing organizations come telephone equipment, telephone instruments, and telephone wires and cables which are world-famed for their quality. Following this reputation around the world has come a growing demand for these products, from telephone companies and operating administrations everywhere.

The International AUTOMATIC ELECTRIC Group is prepared, through its world-wide organization, to meet every demand for these products.

We are affiliated, in our Group, with telephone companies operating in seventeen states in the United States, also in Canada and elsewhere. The International AUTOMATIC ELECTRIC Group thus has available the experience of these operating companies, and offers the necessary technical skill and operating experience for the engineering and installation of telephone plants of any size in any part of the world, and is prepared to finance such plants if and as desired by any customer. All inquiries will receive prompt attention.

International
AUTOMATIC ELECTRIC
Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

AUTOMATIC ELECTRIC SALES COMPANY, S. A.
22 Rue du Verger Antwerp, Belgium

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and seconds is the basis for

determining **TOLL CALL CHARGES**

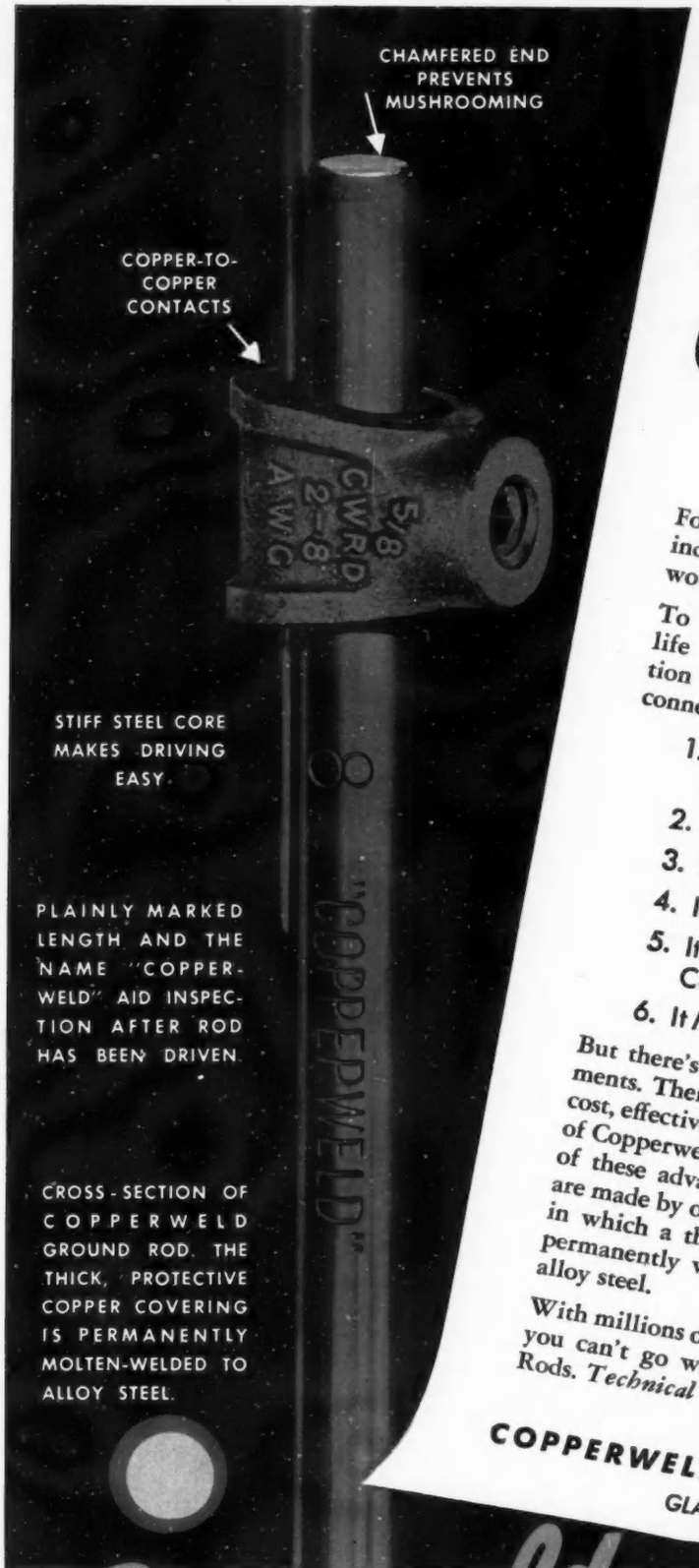
CALCULAGRAPH prints

this essential elapsed time data

WITHOUT ANY COMPUTATION

CALCULAGRAPH COMPANY

310 SUSSEX STREET • HARRISON, NEW JERSEY


CHAMFERED END PREVENTS MUSHROOMING
COPPER-TO-COPPER CONTACTS
5/8 CWRD 2-8 AWC
STIFF STEEL CORE MAKES DRIVING EASY
PLAINLY MARKED LENGTH AND THE NAME "COPPERWELD" AID INSPECTION AFTER ROD HAS BEEN DRIVEN
CROSS-SECTION OF COPPERWELD GROUND ROD. THE THICK, PROTECTIVE COPPER COVERING IS PERMANENTLY MOLTEN-WELDED TO ALLOY STEEL.
"COPPERWELD"

THE "LOWDOWN" ON Good Grounding

For the benefit of newcomers in the electrical industry and as a reminder for old timers, we would like to re-state a few basic facts.

To insure permanent, low-cost protection to life and property and to improve the operation of electrical systems, a pole line ground connection must meet these requirements:

1. It Must Have Good Electrical Conductance
2. It Must Be Able To Resist Corrosion
3. It Must Reach Permanently Moist Soil
4. It Must Be Rugged And Easy-To-Drive
5. It Must Have Copper-To-Copper Contacts From Pole To Ground
6. It Must Be Easy To Inspect

But there's no need to memorize these requirements. There's a much easier way to insure low-cost, effective grounds. Simply use the proper size of Copperweld Ground Rods and you will get all of these advantages. Copperweld Ground Rods are made by our unique Molten-Welding Process in which a thick, protective layer of copper is permanently welded to a core of high-strength alloy steel.

With millions of them giving dependable service you can't go wrong with Copperweld Ground Rods. *Technical Bulletin sent on request.*

MADE BY
COPPERWELD STEEL COMPANY
GLASSPORT, PA.

Copperweld GROUND RODS AND CLAMPS

stocked and sold by { HUBBARD & COMPANY, National Sales Agents and all their distributors and JOSLYN MFG. & SUPPLY CO., National Distributors

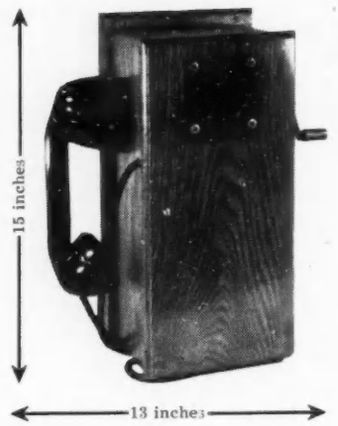
The BANTAM

MAGNETO WALL TELEPHONE

Wall Space Required 13" x 15"

is available for

Immediate Delivery



Unconditionally Guaranteed to give Satisfactory Service

REPLACEMENT PARTS ARE AND WILL
Be Available for Prompt Shipment at all Times

These Modern Features are Standard in "BANTAMS"

Smaller Cabinet requiring only 13" x 15" of wall space is strongly built and nicely finished.

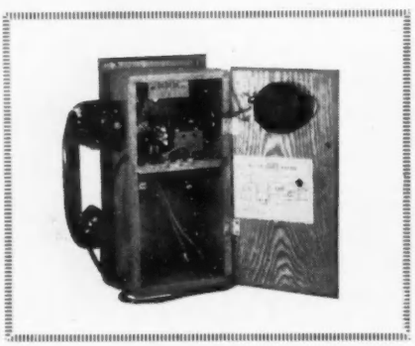
Latest style handset of handsome black plastic with sealed capsule type transmitter and receiver units provides exceptionally clear voice transmission and long, trouble-free service. Many of the latest developments of the United States Army are incorporated into this unit. The electrical circuit is that used by the Signal Corps on telephones similar to farm telephones and will operate on all moderately loaded grounded (1 wire) or metallic (2 wire) systems.

The mighty midget generator, equipped with Alnico magnets, is extremely small, measuring only 3½" x 3½" x 4", yet more powerful than many of the largest old style 5 bar generators, insuring plenty of ringing current to overcome adverse conditions. Alnico magnets are fifteen times more powerful than good magnets of the old style. "Silent Ring" wired so that the bell will not ring when calling central or making other outgoing calls. The ringing circuit is so arranged however, that incoming calls will ring even though the handset is off the hook.

Endorsed by and now being installed by many of the largest of the independent operating companies in the country.

PRICES

Bantam Magneto Wall Telephone with 1600 ohm ringer	$28.00
Bantam Magneto Wall Telephone with 2500 ohm ringer	28.50



DAN'L H. McNULTY,
President & Manager

'Since 1926'

TELEPHONE REPAIR & SUPPLY COMPANY

1760 Lunt Avenue **Chicago 26, Illinois**

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

July 15, 1947

Dear Sir:

Passage during current session of Congress of legislation boost minimum wage from its present 40 cents an hour to levels ranging from 60 to 75 cents is deemed unlikely because of desire to adjourn by end of July. Independent telephone companies got some cheer from views of certain members of the House Labor Committee who felt burden of higher minimum wages would be serious for small telephone companies & small businesses generally. USITA Executive Vice President, Clyde S. Bailey testified before House Labor Subcommittee July 7; asked for liberalization of exemption for Independent companies from present 500-station exemption to 1,000 stations. This proposal, it will be recalled, was approved by Senate Labor Committee last year in its action on increasing of minimum wage but House refused to pass such boost in wages, so legislation died.

* * *

Chairman Milo R. Maltbie, of New York Public Service Commission, defined responsibility of utility company to public in recent statement referring to Long Island Lighting Co. Company was ordered to supply gas home heat to 1,858 new customers which company and subsidiaries had obligated themselves to serve.

Chairman Maltbie said, "It is clearly the obligation of every gas company subject to the jurisdiction of this commission, to render adequate service to every person entitled to receive service under the provision of statute and the orders of the commission."

"The obligation imposed by the Public Service Commission Law upon every gas company to provide adequate service is not limited to what the company can do after an application is made for service," the statement maintained. "It requires that the responsible officials of every company keep themselves fully informed as to the possibility of increased demands for service throughout the entire territory which it has been authorized to supply. If due diligence is not exercised and if facilities, materials and an able and efficient staff are not provided, the company may expect that it will be called to account in the proper form."

* * *

E. F. McDonald, Jr., pres. of Zenith Radio Corp. last month unveiled new device to insure televisors a "boxoffice." Boxoffice "take" is insured, Zenith said, because image is broadcast minus key frequencies. Although remaining frequencies are broadcast in usual manner, picture is confused blue. Missing frequencies will be sent by telephone under McDonald plan, so that all subscriber will have to do to get complete picture is call telephone operator, tell her what

program he wishes to see. At end of month, subscriber will be billed for long distance calls. Mr. McDonald said phone vision receiver will not in any way interfere with the use of the telephone; predicted that phone-vision receiver would replace all other types, since they will receive the "pay as you see" programs which he said are on the way . . . Spokesmen for Illinois Bell, however, pointed out laws prohibiting attachment of "foreign" device to telephone.

* * *

Senate Interstate Commerce Committee will not act at current session on White bill to revamp structure of FCC & revise broadcasting regulatory provisions, its author, Senator White of Maine, Committee Chairman & Senate Majority Leader, announced at conclusion of two weeks of hearings.

* * *

Bell System companies continue to add to their rate increase requests to meet added wage costs after strike. Latest to seek additional rate boosts were Chesapeake & Potomac of West Virginia which revealed this intent after state commission had granted 12% boost in exchange rates, & New Jersey Bell which asked $5.4 million revenues boost for wage increase above original $10.7 million rate increase.

* * *

Small business tax plan recently presented before House Ways & Means Committee makes 3 basic changes in peacetime tax laws. It would: (1) Allow any business enterprise to deduct 25% from its taxable net income up to total of $25,000 in any one year to pay for new plant & machinery; (2) make permanent the tax credits and refunds allowed for operating losses in wartime statutes and permit companies to take advantage of these credits and refunds over seven, instead of five-year period, & (3) provide more graduated scale of corporate taxes starting at 15% on the first $10,000 of net income and increasing to 35% on income in excess of the first $100,000.

* * *

Illinois Bell reports faded earnings have left it hard up. During January & February, 1947, there was only dime per month in earnings for each $100 share of stock. Then came strike. Once more earnings "took it on the chin," so in second quarter Illinois Bell is operating in red. Principal item of expense is wages & other employee benefits which take 71 cents out of every dollar company takes in. Four-dollar increase following strike, if extended to all Illinois Bell employees, will add more than $8,370,000 to company's wage bill.

* * *

Highlights: Berryville (Ark.) Tel. Co. to construct new central office . . . R. L. Thomas & G. W. Thomas have purchased telephone exchanges in Cotter, Leslie, Marshall & Yellville, Arkansas . . . Southwestern States Tel. Co. sold exchanges in Ozark, Altus & Alma, Ark., to James Elliott Thompson. Howard P. Barlow is new gen. traffic supv. Associated Tel. Co., Ltd., Santa Monica, Calif.

Last minute run-down on critical metals: Steel, most important in central office equipment is worsening; lead for cable still critical with only dribbles; copper supply slightly better. New coal wage agreement will undoubtedly be reflected in higher costs to manufacturers.

Ray Smith

Ray W. Smith, Editor

PROLONGED LIFE

for your New or Worn Cables

Reliable

ZINC CABLE HANGERS

because—

- ✓ Cable is bonded solidly to strand.

therefore—

- ✓ All Cable movement is eliminated.
- ✓ No possibility of wear or sheath cutting.
- ✓ Added protection against lightning.

- **They are strong, economical and easy to install.**
- **They are trouble-free for the life of the cable.**
- **They are available for galvanized strand—also available in copper for use with copperweld.**

BUILD FOR THE FUTURE—

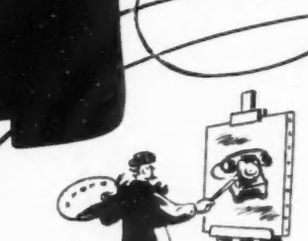
Specify Reliable!

Reliable

ELECTRIC COMPANY

3145 CARROLL AVENUE **CHICAGO 12, ILLINOIS**

OVER 40 YEARS *Service* TO THE TELEPHONE INDUSTRY



KELLOGG

1000 SERIES

Masterphones

SET THE TREND FOR YEARS TO COME

KELLOGG SWITCHBOARD & SUPPLY COMPANY

Masterpieces

Throughout history the creation of a masterpiece has "set the trend" for others to follow. In telephones, the Kellogg 1000 Series Masterphone has set the trend in modern telephone design.

Here is the instrument that has won subscribers' acclaim for its distinctive, smart appearance. Here, too, is telephone engineering at its best . . . all the features to assure highest operating efficiency with lowest maintenance cost.

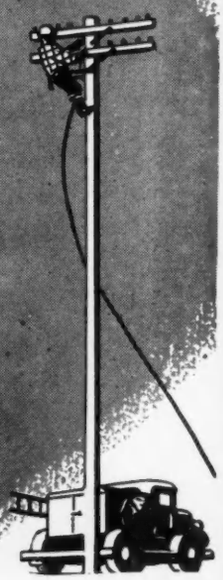
Select the telephone that combines more outstanding, desirable advantages than any other telephone today—choose Kellogg 1000 Series Masterphones.

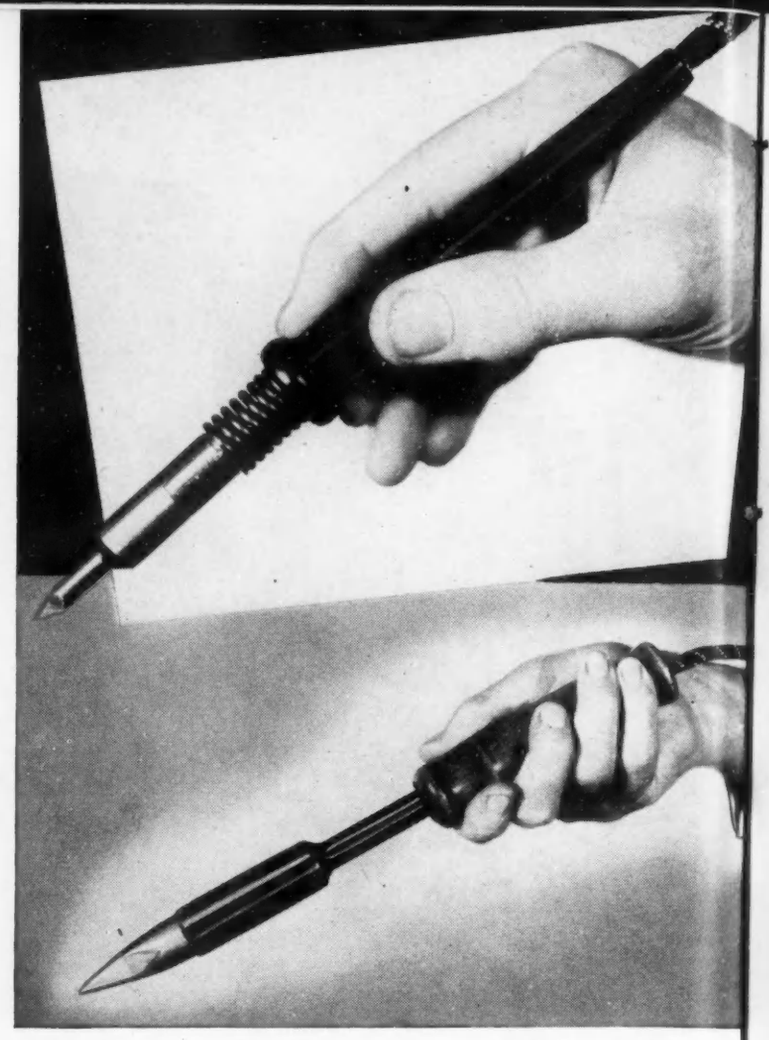
ANOTHER EXAMPLE OF KELLOGG LEADERSHIP

6650 SOUTH CICERO AVENUE, CHICAGO 38, ILLINOIS

The Satisfaction Lasts When You Buy Products

Recommended and Guaranteed by KELLOGG





Neat, Precision Soldering is easy when you use a Vulcan Electric Soldering Iron. The high powered heating element assures a long life of unimpaired heat production. These VULCAN ELECTRIC CO. irons come in 15 sizes of screw and plug tip types—including the "Pygmy" tool, shown at top, for delicate soldering in cramped spaces. Copper tips are easily replaceable.

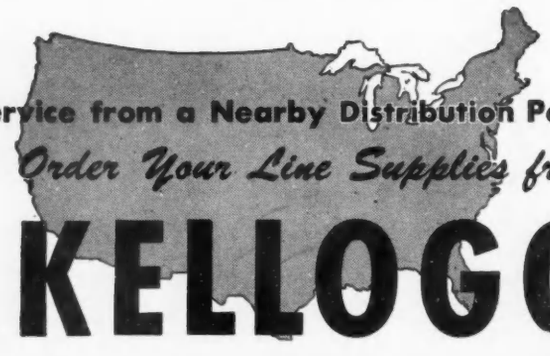
More Lines, More Power. For the special needs of the Telephone Industry, in these days of service expansion, PHILCO provides the famous Floté Battery in glass (illustrated), and in rubber and Vitrabloc jars. This different battery marks a major advance in design. It eliminates low cells in full float service, reduces maintenance costs, increases battery life.

There's three-way satisfaction when you concentrate purchases of line supply and constuction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

KELLOGG SWITCHBOARD & SUPPLY COMPANY

Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles

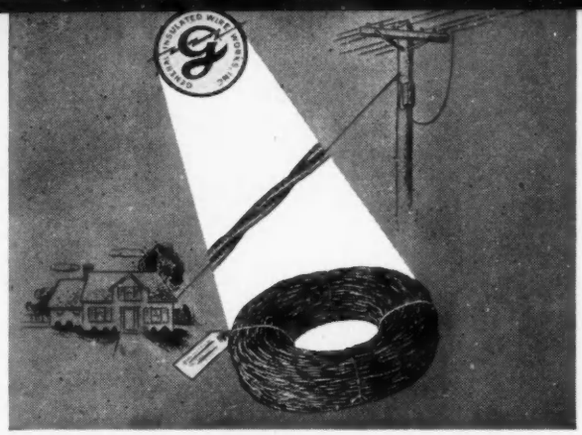
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38



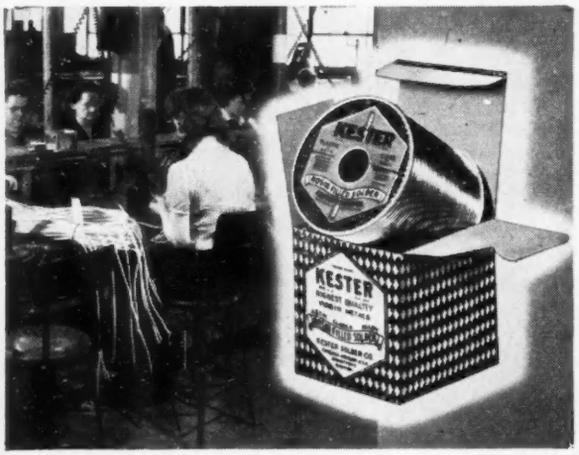
For Service from a Nearby Distribution Point

Order Your Line Supplies from

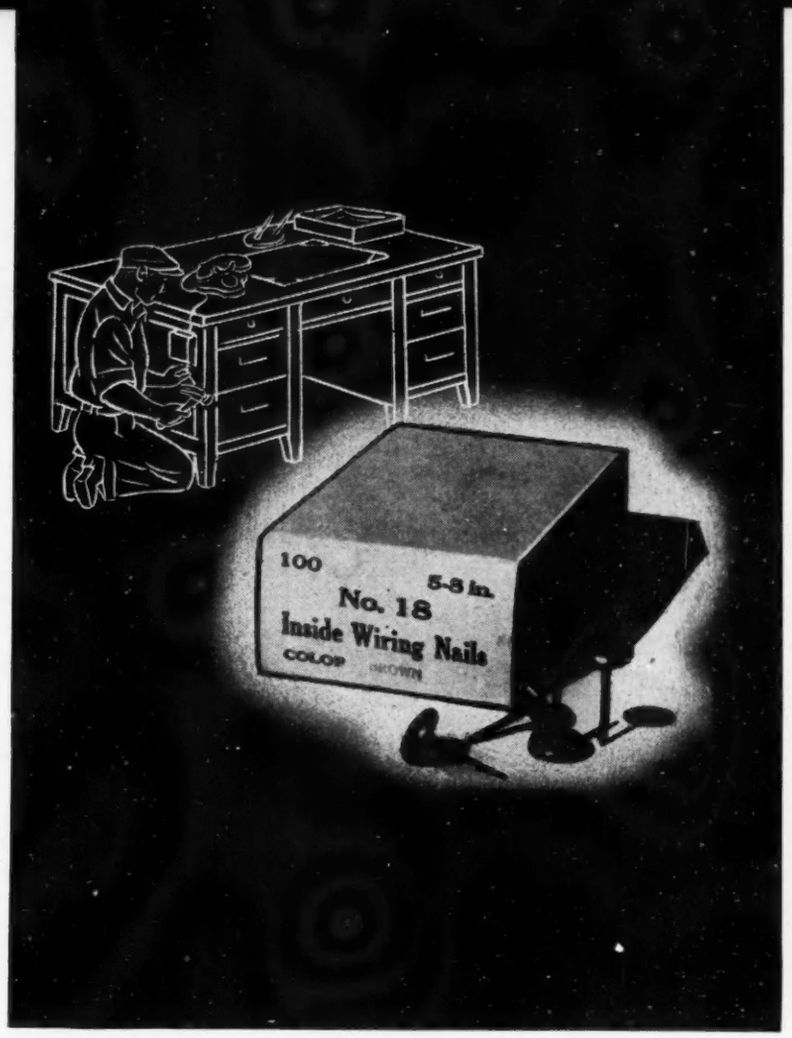
KELLOGG



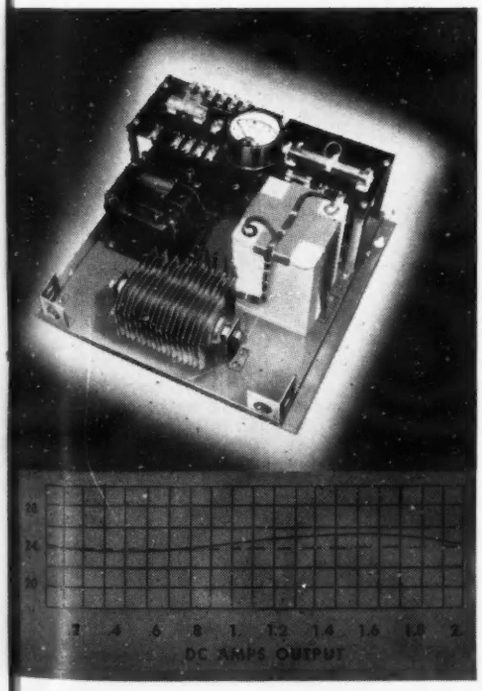
Increase Drop Wire Life 30% by using GENERAL INSULATED WIRE WORKS Bronze Drop Wire. This high conductivity wire is drawn of solid non-corrosive bronze and covered with special "armored" insulation for lasting all-weather protection. It's flexible . . . easy to work with.



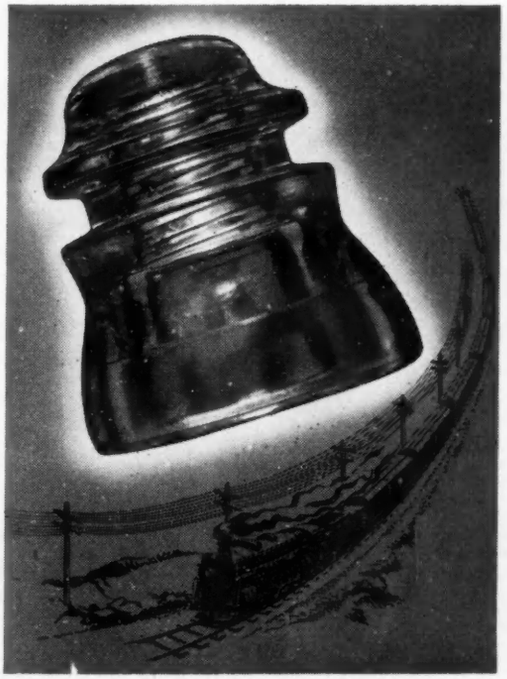
Sealed Against Trouble. Manufacturers of communication equipment insist on Kester Rosin-Core Solder for eliminating high-resistance joints and intermittent open-and-closed circuits. Remember to use KESTER SOLDER COMPANY Rosin-Core Solder throughout your telephone system.



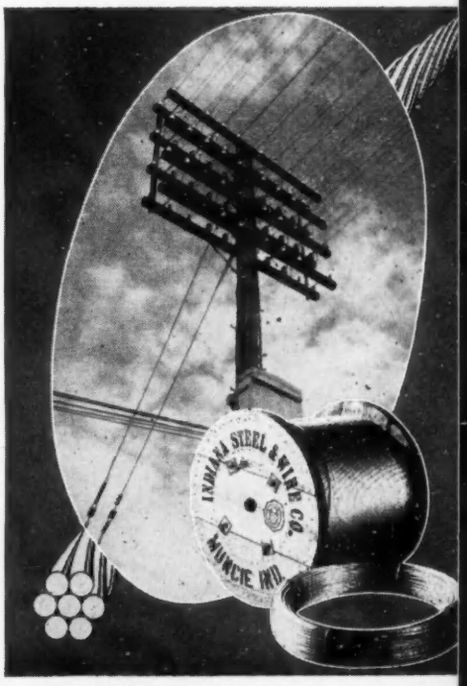
It's a Snap to make neat efficient installations with Rhodes Telephone Wiring Nails, according to telephone men who use them exclusively. M. M. RHODES & SONS maintain the uniform high quality of these nails by means of rigid driving, withdrawing, bending and immersion tests. They are available in several pin lengths and in a variety of colors to match interior color schemes.



Steady DC Voltage, required by switchboard lamps and telephones (especially dial), can be assured when you use a RectiFilter. Made by RAYTHEON MANUFACTURING CO., it operates from regular AC source. And with no moving parts to wear, maintenance is low.



Meet Every Service Need. That's why so many telephone companies are using Armstrong's Insulators, made by ARMSTRONG CORK COMPANY. Some of their outstanding features are crystal clarity of glass, accurate gauging, resistance to variations in temperature. A good bet for lower maintenance costs.



The Time-Tested Steel Strand. A ductile, adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection against corrosion in INDIANA STEEL & WIRE CO. Crapo Steel Strand. Its rugged strength minimizes maintenance expenses.

COMPETITIVE BID SALE

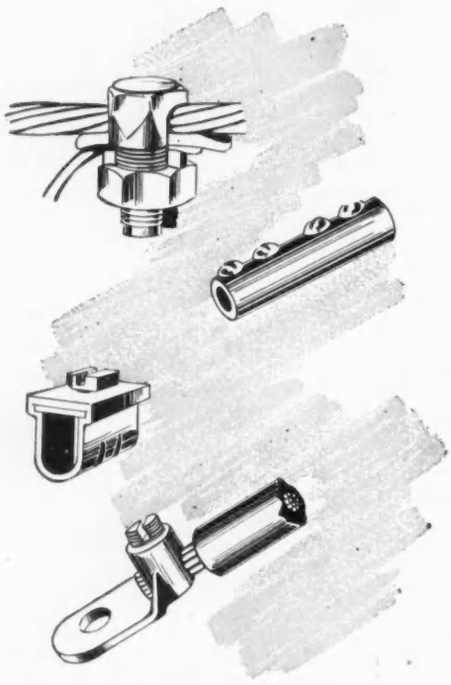
SOLDERLESS CONNECTORS

SOLDERING LUGS

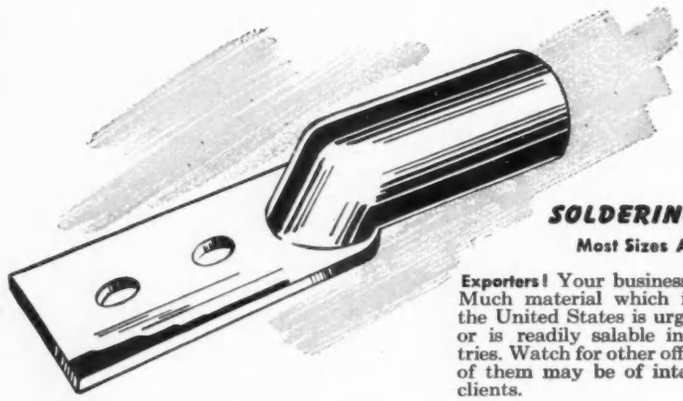
WAA offers you another big chance to save on your electrical material needs.

Here it is—almost $2,000,000 worth of solderless connectors and soldering lugs will be sold on sealed bids. The following Regional Offices: BOSTON, NEW YORK, PHILADELPHIA, CINCINNATI, CHICAGO, LOS ANGELES, SAN ANTONIO and SAN FRANCISCO have the largest inventories.

For full information concerning descriptions of items, location, packaging, and conditions of sale write to any of the above offices or visit your Customer Service Center. At the same time request that your name be placed on the Regional Office mailing list for this type equipment.



SOLDERLESS CONNECTORS
Many Types Available in Large Quantities.



SOLDERING LUGS
Most Sizes Are Available.

Exporters! Your business is solicited. Much material which is surplus in the United States is urgently needed or is readily salable in other countries. Watch for other offerings; many of them may be of interest to your clients.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati
Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena • Houston • Jacksonville • Kansas City, Mo.
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1212

SHERRON
ACOUSTIC
STAINLESS STEEL TELEPHONE BOOTH

GLISTENING STAINLESS STEEL

It Attracts Traffic

Welcoming brightness is the major motif of today's interiors. Stores, public and office buildings, hotels . . . all are brilliantly illuminated and decorated to reflect light . . .

Modern in design, the Sherron Acoustic Stainless Steel Telephone Booth is in tune with the trend to brightness. It's a real traffic attraction.

Here is the one telephone booth you can count on for continuous flow of pay station patronage.

MORE REASONS WHY THE SHERRON ACOUSTICS STEEL TELEPHONE BOOTH IS TOPS:

- *All-metal rigid construction*
- *Improved door hinges prevent creaking or sticking. Door operates easily and quietly in stainless steel track*
- *Automatic, noiseless door switch controls ceiling light of special design, eliminating current consumption when not in use*
- *Linoleum covered steel floor prevents wear on floor of owner's premises*
- *Adjustable shelf and instrument backboard*
- *Electric ventilating unit of improved type*
- *Steel seat of new design*
- *High grade baked enamel finishes*

SHERRON METALLIC CORPORATION

1201 FLUSHING AVENUE • BROOKLYN 6 • NEW YORK

EDITORIAL

The First 50 Years

AT ITS coming October convention the United States Independent Telephone Association will celebrate the 50th anniversary of the existence of a national Independent telephone association. The officers and directors of the Association are planning to go "all out" in the commemoration of that event. They are well justified in doing that—and we will help them in every way that we can—because the significance of the event is more important even than the fact that for fifty years there has been a national Independent telephone association.

THE SIGNIFICANCE is that there could have been no national Independent telephone association for all these years unless there had been also an Independent telephone industry for all that time, or longer. The fact that the national association has a 50th birthday is irrefutable evidence that the Independent telephone industry is no fly-by-night business.

THE FIFTIETH birthday of anybody or anything affords opportunity for reminiscing about the "old days", and for study of the history of those past years. Such history can provide nostalgic reading for the old timers in the industry, and interesting reading for those of the younger generation. But it also has a much more important function than either of those things. That function is to tell us the things that we have done well in the past, and those that we have done badly, and to teach us how to avoid, in the future, the mistakes we have made in the past.

WE LEARNED by experience, during the first 50 years, that competing telephone exchanges are bad for both the industry and the public—so we had to do away with that competition wherever it existed. We learned to our sorrow in those several economically dismal years beginning with 1932, that the telephone business is not a depression-proof business. We learned, through two great and devastating world wars, how to operate under makeshift conditions. We gained, during those 50 years, a vast amount of knowledge about such things as construction, equipment, maintenance, depreciation, regulation and other matters integral to the telephone industry and business.

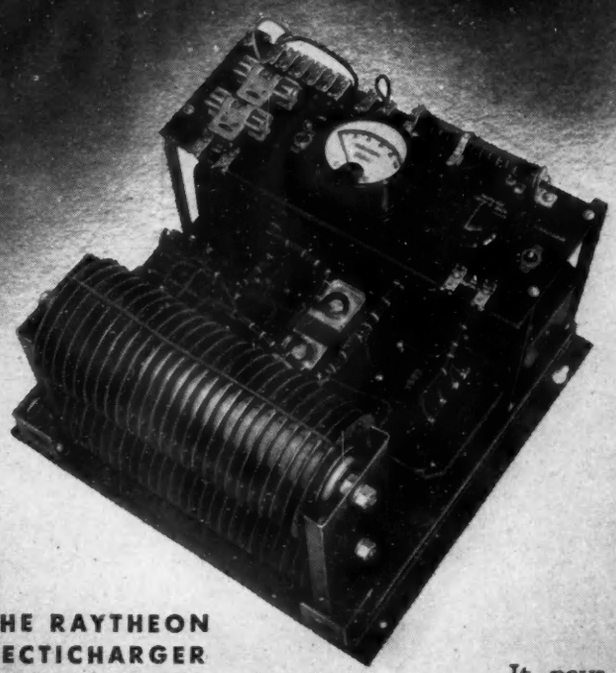
WE ARE now learning many new things—things, in fact, that were undreamed of when the first national Independent telephone convention was held in that year of 1897. Among these things are the problems that go with the integration into the telephone business of such new-fangled services as mobile telephone, radio, carrier current, toll dialling and ticketing, voice recorders and so on. We are learning a lot about such things.

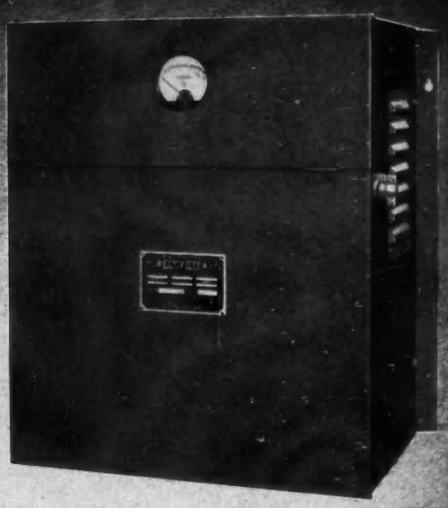
BUT, even with 50 or more years of experience behind us, we do not yet know it all—which is one of the reasons for which we need and shall continue to need our national association and our state associations. They are, amongst other things, gatherers and disseminators of information and knowledge about things we need to know.

THE first 100 years, it is said, are the hardest. According to that, all the industry and the national association has to do is to get through another 50 years, then our problems will begin to diminish. Maybe so, but we doubt it. We think it very likely that when the United States Independent Telephone Association holds its 100th convention, in the year 1997, the boys will still have plenty of problems to talk about. And a good many of those problems will, we think, be of a nature we cannot even visualize today.

Modernizing Switchboard Equipment?

Then consider the many advantages of incorporating Raytheon RectiChargers or Rectifilters





THE RAYTHEON RECTIFILTER

OUTLASTS BATTERIES many times.

ELIMINATES TROUBLE and expense of routine service for battery inspection.

RELEASES WIRE carrying charging current from the central office to subscribers' PBX boards for revenue producing service.

MINIMIZES POWER COST because of high efficiency in converting AC to DC.

Write for Bulletin PL-RFR-508

THE RAYTHEON RECTICHARGER

DC STABILIZER, magnetic, non-wearing, automatically provides constant voltage output regardless of variations in load.

AC STABILIZER, also magnetic type, makes unit independent of AC line fluctuations from 95 to 130 volts.

DRY DISK RECTIFYING UNITS for long life, no expendable parts.

CORRECT TRICKLE RATE, output adjustable to meet battery manufacturer's recommendations.

OVERCHARGE SWITCH permits application of equalizing, soaking or freshening charge to battery.

INTERIOR PARTS ACCESSIBLE—cover readily lifted by removing screws.

Write for Bulletin DL-RCR-506

It pays to keep batteries in main exchanges fully charged and in top condition. Raytheon RECTICHARGERS do this, carry the normal current demand, and offer in addition all of the advantages outlined above.

For DC power to PBX and PAX boards *you need no batteries* . . . Raytheon RECTIFILTERS handle the job better and with less expense and trouble. Write for either or both of the Bulletins offered.

RAYTHEON

Excellence in Electronics

RAYTHEON MANUFACTURING COMPANY

COMMERCIAL PRODUCTS DIVISION

WALTHAM 54, MASSACHUSETTS

Industrial and Commercial Electronic Equipment, Broadcast Equipment, Tubes and Accessories

Sales Offices: Atlanta, Boston, Chicago, Cleveland, Louisville, New York

Your regular supplier of Telephone Equipment will be glad to help you select the proper Rectifilter or RectiCharger for your application.

THE STROMBERG-CARLSON NO. 1243 TELEPHONE

STROMBERG-CARLSON

Factory, General Offices: Rochester 3, N. Y.
Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto

STROMBERG Telephone CARLSON

TELEPHONES, SWITCHBOARDS AND INTERCOMMUNICATION SYSTEMS • SOUN

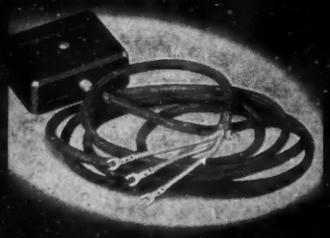
lame on

QUIPM

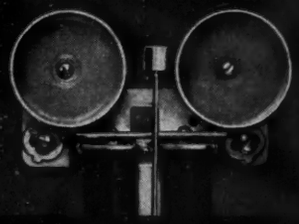
E..."gives a 25% quality bonus!"

In the words of an executive of one of America's largest operating companies,* the Stromberg-Carlson No. 1243 Telephone embodies design and engineering advancements that make it "25% better" than preceding models. Significantly, production savings and engineering ingenuity have kept its cost surprisingly low . . . proving again that in value as well as quality, *"There is Nothing Finer than a Stromberg-Carlson."*

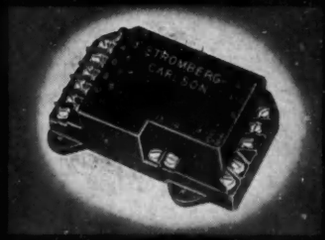
HERE ARE SOME OF THE FEATURES THAT DELIVER THIS 25% BONUS:



All Stromberg-Carlson telephones have Vinylite waterproof cords. New black plastic terminal block harmonizes with the design of the No. 1243 Telephone.

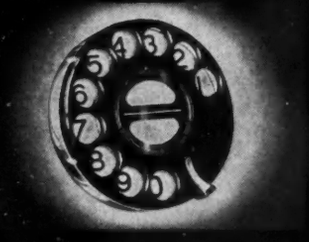


New ringer design incorporates Alnico magnets which greatly improve the efficiency of the signal when the instrument is used on long loops.



Reduced side-tone is obtained by use of a new induction coil and coil capacitor assembly—a universal unit which can be used for all services on all types of phones.

Noted for its outstanding performance and efficiency, the new Stromberg-Carlson transmitter, through improved design, is now thinner and handsomer than ever.

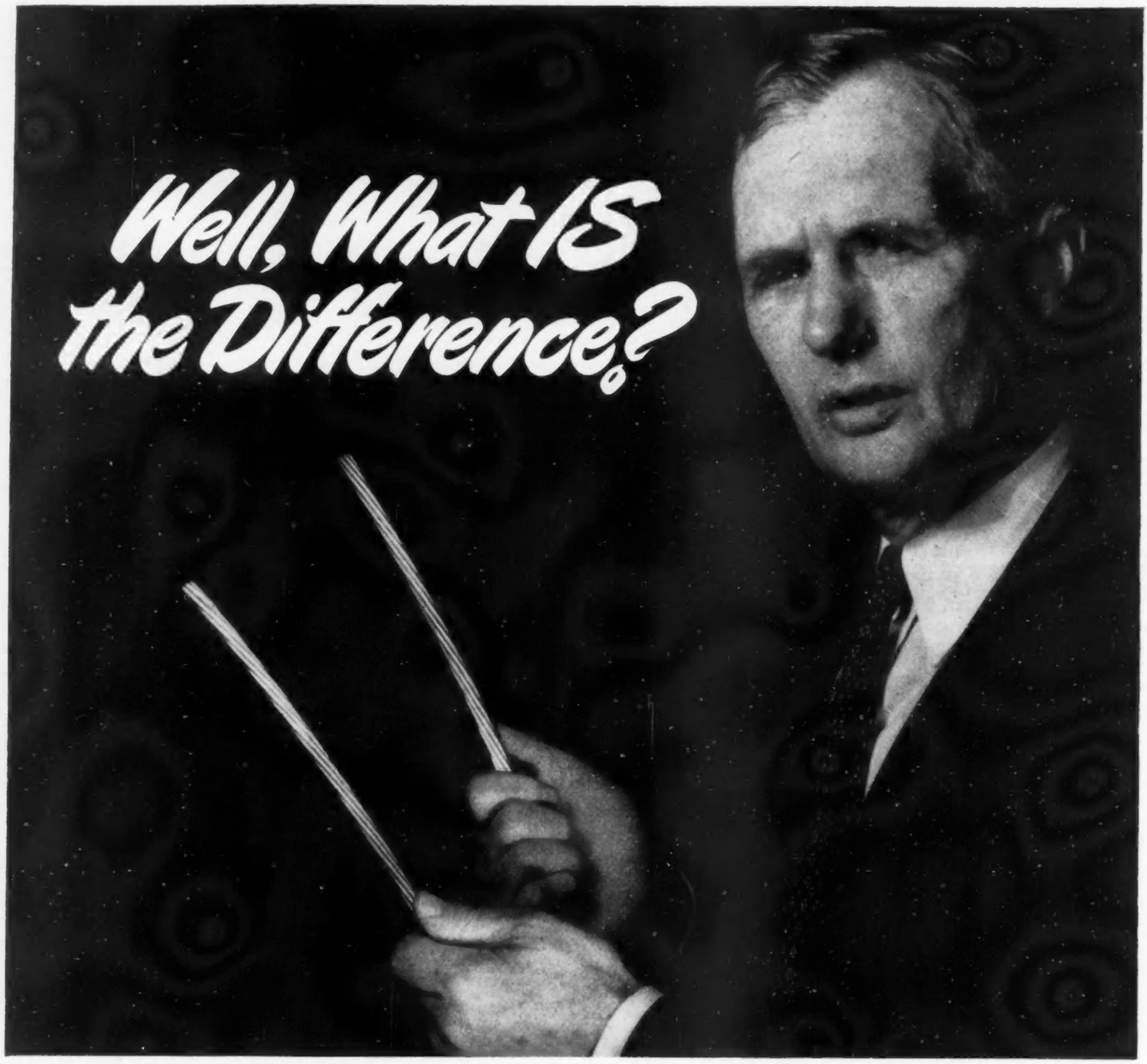


The Stromberg-Carlson dial is precision-built for years of smooth, fast, quiet operation. Non-glare figures, durable finger plate. Plastic dust-cover protects mechanism.

A simple mechanical adjustment provides two-step hook-switch operation. Subscriber, by removing handset, can tell if line is in use without connecting transmitter.

lame on request

SOUN QUIPMENT AND INDUSTRIAL SYSTEMS • RADIOS, RADIO-PHONOGRAPHS, FM AND TELEVISION



A piece of Bethlehem strand looks much like any other kind. But there's a vital difference that has nothing whatever to do with looks.

Bethlehem strand is the *only* strand that is furnished with a bethanized coating—a highly-pure layer of zinc applied electrolytically. The Bethlehem method produces a coating so ductile that it virtually eliminates cracks and checks. You can bend, bend, *bend*—and still the jacket retains its full protective power.

Moreover, this bethanized coating is uniform. That's an important feature. No thin spots here and thick spots there. Every inch of every wire in your Bethlehem strand is protected uniformly against the corrosive effects of moisture, smoke, and acid fumes. And you have a choice of A, B, or C coating weight* —whichever is most suitable for conditions in your area.

We'd like to tell you about other advantages of bethanized strand. Why not call us and ask for full details?

*A—conforms to extra-galvanized; B—twice the weight of A; C—three times the weight of A. All as covered by ASTM Specifications Nos. A122 and A218.

BETHANIZED STRAND

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

NEWS BRIEFS

Leedey (Okla.) Telephone Co. Hit by Tornado

The Leedey (Okla.) Telephone Company, which was almost completely destroyed by the recent tornado which wiped out a large part of the town, is in great need of materials and supplies for rebuilding its plant, including a magneto switchboard, according to a special bulletin issued by H. W. Hubenthal, secretary, Oklahoma Telephone Association.

Mr. Hubenthal requested any companies having surplus materials or equipment which would be useful in rebuilding the plant, to communicate with Paul Fox, manager and owner at Leedey, Oklahoma.

Mr. Hubenthal's letter stated that skilled workmen are needed to assist in rebuilding the plant and provide service to subscribers who are now without service.

◆

Commonwealth Plans State-Wide Rate Boost

The Commonwealth Telephone Co., Madison, Wisc., has withdrawn its application for a rate increase at its Edgar, Wisc., exchange, with a view to making it part of a statewide rate boost request. The Edgar application, filed in connection with a proposed conversion from magneto to automatic operation, was filed last October. When the company was notified that the commission would set the case for hearing, it withdrew the request rather than have the case heard separately from the projected statewide application.

◆

Georgia Continental Company Bond Issue Approved

The Georgia Continental Telephone Company has received authority to sell $65,000 principal amount of First Mortgage, 4½%, 25 Year, Sinking Fund Bonds, Series A, to the Continental Telephone Company. Proceeds are to be used for the construction, extension and improvement of telephone facilities.

At the hearing, the company introduced exhibits setting forth its proposed construction program for the years 1947 and 1948. The exhibits indicated that the company proposed to expend $105,015 on the construction program in the two years beginning January 1, 1947, and by letter dated June 12, 1947, the company advised the commission that in addition to this program, two projects have since been approved entailing the expenditures of approximately $6,222, increasing the program to $111,237.

◆

Members of this Kansas convention group are: R. A. Lumpkin, USITA president; Dinsmore, Hale, and White.

Associated T. & T. Reports Income Boost for '46

The consolidated statement of the Associated Telephone & Telegraph Co., showed that revenues of the telephone division rose $1.5 million in 1946. The manufacturing and sales division grossed $2.4 million more than in 1945. Operating profit, however, showed up better in the telephone group, which produced about $2 million of the $3.6 million reported for the whole system. After interest on $31.4 million of funded debt and payments to minority interests, the company had a 1946 net of $1,068,491, compared with 1945 profit of $87,155.

The telephone property account was carried at $43.5 million, against $41.1 million a year earlier. Investment in the Philippine Long Distance Telephone Co. was reduced from $3.4 million to $2.9 million.

◆

Telephone Advertising Institute Service 97% Satisfactory

The advertising service provided to the Independent industry by Telephone Advertising Institute is 97% satisfactory, according to the current survey of subscribers, just completed by the Institute.

More than 43 per cent of the entire subscriber group replied to the questionaire—a total of 125 Independent companies.

The Institute, established in 1944 to provide advertising material for Independent companies, conducts two surveys each year to help determine industry advertising needs and to analyze how fully needs are being met. Survey results are then used, along with other research, as the basis for planning future materials.

The survey revealed that, in general, companies are making maximum use of newspaper advertising, displays, direct mail, and other services provided by the Institute.

Subscriber companies also evidenced more interest in the program than ever before, for a large number offered suggestions for improvement and submitted ideas for advertising material.

★ *TELEPHONE ENGINEER and MANAGEMENT'S*

Washington

BUREAU REPORTS

by
ROLAND C. DAVIES
and
FRED HENCK

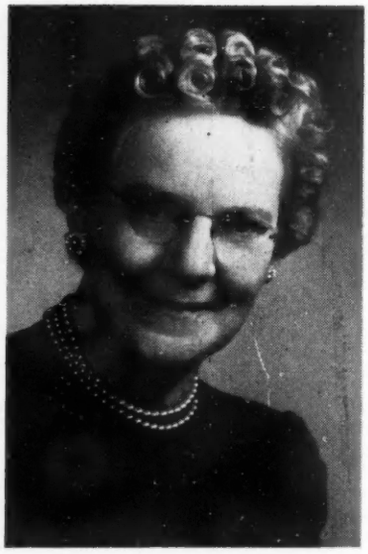
Minimum Wage

THE often-advanced proposal to raise the statutory minimum wage from its present level of 40 cents an hour, killed in the last session of Congress by the farm-parity amendment rider, has been brought up again at this session in hearings before a House Labor subcommittee named to consider about a dozen bills to lift the base wages to figures ranging from 50 to 65 cents an hour.

Executive Vice President Clyde S. Bailey of U. S. Independent Telephone Association slated to testify before the group; undoubtedly will urge that the present exemption of Independent telephone companies be raised from the 500-station limit to a higher level.

Passage of the bill is deemed unlikely at present session, because of strong Southern opposition, but it is reliably reported that the Republican majority is now behind the minimum wage bill in an attempt to restore some labor support lost in the approval of the Taft-Hartley Act. Thus a higher minimum wage figure may well come at the next year's Congress, which of course would be immediately before the Presidential election.

A likely eventual result is a compromise at perhaps 50 cents an hour, although higher minimum wage proponents are advocating figures of upwards of 75 cents. The Republicans, who probably would not lose any political support by pushing through a higher figure, would definitely alienate Congressional support in the form of the southern Democrats. The backing of the latter is particularly important to the GOP on the Senate side because of the narrow Republican majority, and southern Democrats have more than once joined with the GOP to push through measures over the opposition of the northern Democrats and some dissident Republican—Morse, Langer, Tobey, and Aiken, particularly.



Miss Louise Pohlmeyer, chief operator, Howe T. & T. Co., Fort Wayne, Ind., retired June 1 after 42 years of continuous service.

◆

USITA Tax Committee Turns To Corporate Levies

WITH THE possibility of excise tax relief for the communications industry fading slightly as Congressional adjournment nears, the U. S. Independent Telephone Association Tax Committee has turned its attention to another subject—the revision of corporate levies. The presentation was made before the House Ways and Means Committee, which is considering the overall revision of the nation's tax structure, by Harold V. Bozell, President of the General Telephone Corp. and Chairman of the USITA Tax Committee.

Mr. Bozell's statement argued that six changes should be made in corporate taxes:

(1) That the double taxation of corporate earnings—once to the corporation and again to the shareholders upon receipt of dividends—be eliminated.

(2) That the partial taxation of intercorporate dividends be eliminated.

(3) That the 2% penalty tax on the filing of consolidated tax returns be eliminated.

(4) That the present two-year net loss carry-forward provisions be extended to provide for a carry-forward for at least a five-year period, and the two-year carry-back provisions be eliminated.

(5) That the provision for the deduction for depreciation be liberalized to allow greater leeway in determining what is a reasonable allowance for depreciation and that the amount deducted on the return or finally allowed upon examination by the Bureau of Internal Revenue be considered as the allowed or allowable depreciation.

(6) That the provisions of Section 102 relating to unreasonable accumulations of surplus be amended to provide that the judgment of the directors of a corporation relative to the retention or distribution of earnings be considered prima facie correct so as to relieve the taxpayer of the undue burden of proving unreasonableness of accumulating surplus.

The presentation was signed by the Tax Committee, consisting of, in addi-

tion to Mr. Bozell, John H. Agee, vice president of the Lincoln (Nebr.) Telephone & Telegraph Co., V. E. Chaney, vice president of the Telephone Bond & Share Co., D. O. Hood, president of the Columbia Utilities Co., Medford, Ore., Judson Large, secretary and treasurer of the Central Telephone Co., John R. Porter, chairman of the board of the Carolina Telephone & Telegraph Co., Tarboro, N. C., and Fred Switzer, president of the Harrisonburg, Va., Telephone Co.

Citizens' Radio Technical Requirements Proposed

THE REALITY of the Citizens Radio Service was brought a step nearer recently when the FCC proposed establishment of technical requirements and procedure for obtaining type approval of equipment for use of radiotelephone by individuals.

Under the Commission's proposals for the new service, manufacturer-applicants for type approval of their equipment must send a typical production model, complete with tubes and power supply, to the FCC's laboratory at Laurel, Md., for test. An official report of the tests will be made available only to the manufacturer involved but from time to time the FCC will publish lists of approved equipment.

In a news release accompanying the Commission's proposed rules, the FCC said that the Citizens Radio Service (formerly known as the Citizens Radiocommunications Service) will provide an opportunity for adapting short range equipment, including pocket-size sets under development, to varied personal needs. "The possibilities for utilizing this type of radio are unlimited," the FCC said, pointing to possibilities of providing contact in isolated places, such as ranches, farms, and industrial property. The equipment can be used for doctors, surveyors, hunters, fishermen and many other individuals, it was added.

As in the case of all other types of radio operation, authorization will be necessary, the FCC said, but in the case of the Citizens Radio Service the Commission contemplates a simple procedure requiring no technical knowledge by the prospective user.

Wakefield Leaves FCC

BIDDING FAREWELL to his FCC Commissioner associates and members of the staff on the last day of his term of office June 30, retiring Commissioner Ray C. Wakefield left Washington July 2 to take his first real vacation since he came to the communications agency in Washington in 1941, spending two weeks in New England and the rest of the summer in California. He has not yet announced his future plans but it is anticipated that he will return to the private practice of law, probably in his home state of California where he has many close associates.

"A Mr. Gromyko calling, sir. But he's got the wrong number."

Chairman Denny and the other commissioners and the leading FCC staff officials definitely regretted the departure of Commissioner Wakefield. He was given a reception by the commission staff after attending his last meeting June 26. Mr. Wakefield probably will attend the NARUC convention in Boston July 14-17.

That the Republican Party affiliation of Commissioner Wakefield was not such a hurdle, as pictured in some reports, to his reappointment was evidenced at a private luncheon given in his honor last week. Despite the busy sessions on Capitol Hill, Senator Knowland of California and nearly every Republican Congressman from that state, together with former House Interstate Commerce Committee Chairman Lea (elected both on the Democratic and Republican tickets), attended the affair.

◆

California Commission OK's Pacific Bell Emergency Rate Boost

The California Public Utilities Commission authorized Pacific Telephone & Telegraph company to increase its California rates effective July 6.

The authorization was granted upon the company's plea that an emergency increase in rates was essential to meet wage hikes won by employees in the recent strike.

The emergency increase is separate from a pending application of the company for a permanent overall revision of California phone rates to add another $20,200,000 to P. T. & T. gross revenues.

Extended hearings on the permanent increase were in abeyance awaiting filing of an amendment incorporating the emergency interim increase, bringing the total to approximately $30,000,000.

Utilities commission experts testified they considered the emergency request "justified," while the company said the increase was necessary if only to preserve the company's abnormally low rate" of earnings prior to the wage strike.

◆

Temporary Rate Boost Allowed Illinois Bell

Temporary rate increases that will boost annual revenues by $6 million were put into effect July 1 by the Illinois Bell Telephone Co.

The increase in rates has been approved by the Illinois Commerce Commission. The increases will remain in effect pending a decision on the company's petition for a permanent rate boost.

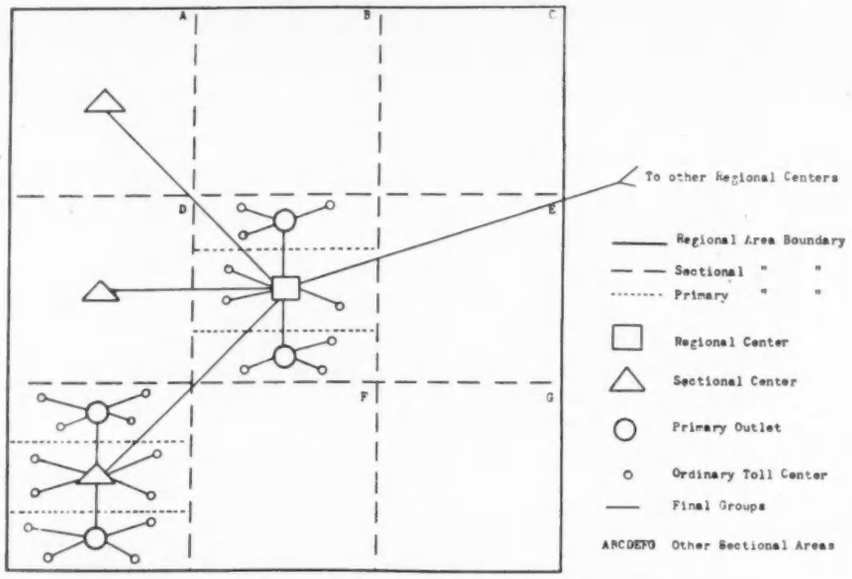


Chart B—Conventional sketch of switching areas and the arrangement of the various classes of toll centers (high usage groups not shown).

TOLL Switching Plan For Nationwide Toll Dialing

(Part II. Part I appeared in the June issue of TELEPHONE ENGINEER AND MANAGEMENT.

Alternate Routing

IT IS proposed to apply to toll routing the basic principles of alternate routing currently employed for plant economy and service reasons in certain large crossbar office cities for local trunking. The principle on which alternate routing is based is that in general the cheapest way to handle a traffic load between two points X and Y is to handle part of it over direct trunks between the two points and overflow whatever calls cannot be handled on the direct XY trunks to an alternate route XZY with a switch at the intermediate office Z. See Figure I. The economic division of the load between the direct and alternate routes is related to the cost of a direct trunk between X and Y as compared with the sum of the costs of an XZ trunk, a ZY trunk and of switching a trunk's worth of load at Z. The direct routing is always cheaper on a *per trunk basis* since even where the geographical routings and circuit mileage are the same for the direct and alternate routes, the alternate route includes additional switching, toll terminal and signaling equipment at the intermediate switching point Z which are not required in the direct trunk.

If the entire X to Y load is offered to one XY trunk, and any XY calls which this single trunk is not free to handle immediately are overflowed manually or automatically to the XZY route, the XY trunk will operate at a high efficiency, perhaps 80 per cent or more if the load is substantial. That is, the XY trunk will be busy a large part of the time during the busy period. If a second XY trunk is added, it will carry less load, and its efficiency will be less than the first. The third will be still less efficient, etc.

Thus the *cost per unit of load* carried on the direct XY route increases as trunks are added on this route, and there is, therefore, a point at which it is cheaper to overflow part of the load to the alternate XZY route than to provide additional direct trunks to carry it. On the alternate route a nucleus of trunks is required for XZ and ZY traffic whether or not there is any overflow to this route so that the added loads due to overflow can be carried at a relatively high efficiency per added trunk on the alternate route. Non-coincidence of busy hours as between the direct and alternate routes is also an element which can be exploited in many cases to realize further economy. For any given set of conditions a determination can readily be made of the number of direct trunks that ought to be provided for the most economical layout and of the amount of overflow to the alternate route. In some cases, particularly where the XY load is small, the most economical arrangement will be to switch the entire load, that is no direct trunks would be provided.

Under the plan as proposed herein a call in general would have several available routes over high-usage groups. These would be tested in a predetermined order and the call advanced over the first route in which an idle trunk was available at the moment of testing.

The small residue of calls not disposed of on the high-usage network are passed with practically no delay to the final group where they are almost certain to find an idle path available. The effect is to keep all trunks busy a larger part of the time, while at the same time the percentage of calls encountering all trunks busy is reduced to a very small figure.

"Home" CSP's and Final Trunks

A TOLL CENTER may have high-usage groups to other TC's and to several CSP's. In addition to these high-usage groups, it is contemplated under the proposed plan that each toll center will have a final group to one particular CSP. This is its "home" CSP and may be a primary

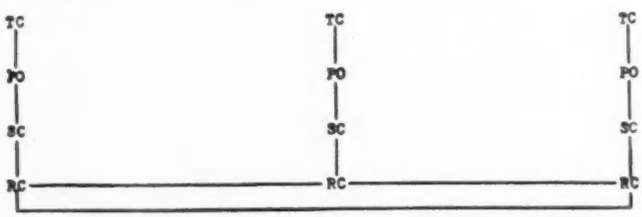


Fig. II—Schematic of the relationship of different classes of toll centers.

outlet, sectional center or regional center. The home CSP serves as the *final* routing point for the toll center for both incoming and outgoing traffic. Similarly each primary outlet has its "home" sectional center (or regional center) and each sectional center its "home" regional center.

The "final" trunk groups are those connecting the ordinary toll center with its "home" primary outlet (or SC or RC); the primary outlet with its "home" sectional center (or RC); the sectional center with its "home" regional center; and the groups which completely interconnect the regional centers. The "final" groups are the "final" routes and collectively comprise the backbone network of paths required to furnish a connection from any toll center to any other toll center.

These final groups would be engineered on a liberal basis; that is, enough trunks will be provided in a final group so that the probability of a call encountering NC is small. While the exact schedule of loading to be used will depend on the circumstances in each case, it is believed that on the average final groups will be engineered to a loading of about P.03. As brought out later on, additional final groups supplementary to the minimum final group layout above can be established wherever the additional costs are warranted.

A schematic of the relationship of the different classes of toll centers and the final routes interconnecting them appears in Figure II.

A few examples of the many possible high-usage trunk groups are as shown in Figure III. A high-usage group can be established between any two points. The number of high-usage groups is expected to be 4 or 5 times the number of final groups.

Routing Pattern

ALTERNATE routing conducted in a definite pattern at each point involved in the connection is contemplated by the proposed plan. The procedure will be that each of the appropriate high-usage trunk groups is tested in a predetermined order and if they are all busy, the call will pass over the "final" route to the next point in the chain of routings at which point a similar pattern of routings will be used to deliver the call to the called point.

The detailed routing pattern for calls between any two points can be visualized from Chart A (page 28, July T E & M). To assist interpretation the various points shown on Chart A have been designated by letters as well as by distinctive codes. The chart is divided into seven sections each of which shows all possible routes from a particular point to toll center E. Referring to section 1 of the chart, the first route between a and e would be the direct high usage trunk group if it exists.

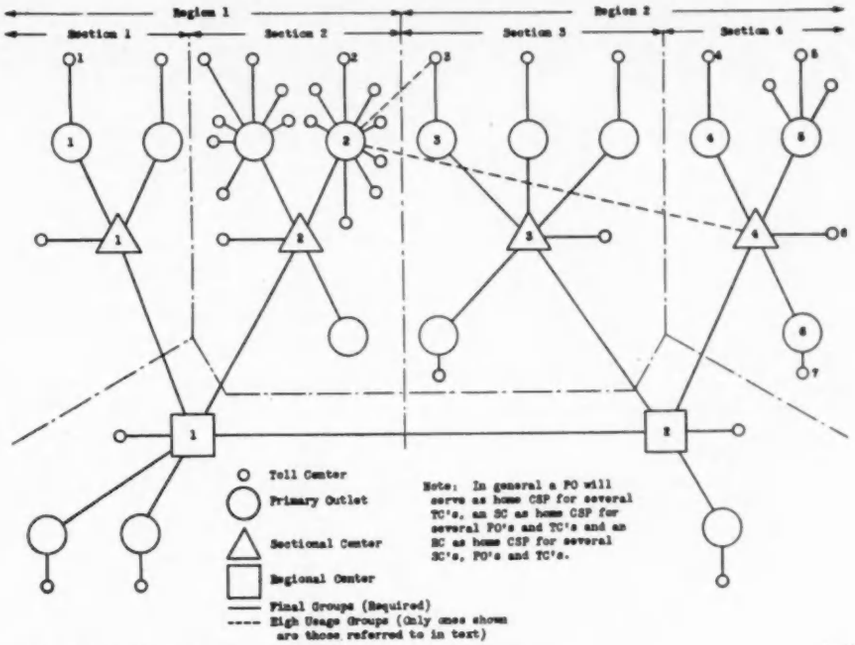

Region 1
Region 2
Section 1
Section 2
Section 3
Section 4
Toll Center
Primary Outlet
Sectional Center
Regional Center
Final Groups (Required)
High Usage Groups (Only ones shown are those referred to in text)
Note: In general a PO will serve as home CSP for several TC's, an SC as home CSP for several PO's and TC's and an RC as home CSP for several SC's, PO's and TC's.

Chart C—Schematic of final low delay layout.

If the ae group does not exist the first route might be via an ordinary toll center i or via the CSP's f, g, h, d, c, b. Suppose that as far as the points shown are concerned the only groups from a are those to d, c and b. In this case the first route on an ae call would be via d. If the ad high-usage group were busy the second route might be to c. If the ac high-usage groups were busy the third and final route would be to b, the home CSP of a. If the call gets to b, the routing choices in order, as shown in section 2 of the chart, are to e, f, g, h, d and c. From c the possible routes to e and the order in which they would be used are indicated in section 3, and the routings from other points to e are shown in other sections. The possible routes between any two points can be determined from the chart. Thus, from section 4, the routes from d to f are, in order, df, dg and dh.

All of the possible routes are shown on Chart A, but not all routes need to be used in all cases. Where more than four routes exist one or more can be skipped. In many cases not all of the high-usage groups shown on the chart will be available because of insufficient traffic to justify a group. For these reasons the actual routing pattern will be much simpler than a first look at the chart might suggest.

The routing pattern is so set up that a "final" path exists from every point to the next succeeding point in the chain of routings leading to the called point so that the call can be completed with little chance of delay due to NC regardless of how much rerouting and switching is involved.

It should be noted that a call is continuously passed to the next CSP in the routing chain. If a call encounters an all-trunks-busy condition at any point, the originating operator will receive a suitable signal and the call must then be dialed again after an appropriate interval.

It will be noted that under the proposed plan some calls may encounter six switches (TC-PO-SC-RC-RC-SC-PO-TC) as compared to the present limit of four switches (TC-PO-RC-RC-PO-TC). It has been estimated, however, that less than 3 toll board calls out of every 100,000 are likely to involve six switches and only a minute percentage will involve five switches. From the transmission standpoint the use of four wire switching equipment at sectional and regional centers tends to offset the disadvantage of the extra switches since in the rare case where six switches are required, at least four of them, would be on a four-wire basis. From the standpoint of effect on speed of service the additional switches are not considered controlling since it is expected that all the testing and switching at a CSP can be done in about 1.5 seconds.

A. Without Sender Systems for Outward Traffic.

This will be the usual condition at

an ordinary TC. The operator will select toll lines in the multiple for outward traffic. All toll lines will be on a high-usage basis except for the final group to the home CSP. It is assumed that not more than three routes will be available to the operator on a given item of traffic; that is, original route, first alternate and final route. Under varying circumstances these three routes will involve the following.

1*st Route*—One of the following:

(a) Direct. Dial only the called number. (This may involve 3 to 7* digits.)

(b) One switch at intermediate TC having a S x S inter-toll train. Dial an arbitrary code of not more than 3 digits followed by the called number.

(c) One switch at intermediate ordinary TC having senders such as a No. 5 crossbar. Dial the 7* digit national numbering plan number or an arbitrary code of not more than 3 digits followed by the called station number.

(d) Via a CSP. Dial the 7* digit national numbering plan number preceded by the 3 digit national numbering plan area code if required.

*One additional digit may be required in some cases for reasons covered in previous note.

1*st Alternate Route*

(b) (c) or (d) under 1st route.

Final Route

Via its home CSP—proceed as under (d) above.

In some cases the variation in operating practices if 3 routes are used may make it desirable to limit the number of routes to 2, the second of which will be the final route.

The inter-toll trunks available to the operator on the original and first alternate routes will be on a high-usage basis and will often be busy, particularly in the busy hour. Also, on single switched connections the trunks from the intermediate office to the terminating toll center will also be on a high-usage basis in many cases. When an operator encounters an all-trunks-busy condition on either leg of switched connections, it will be necessary to reroute. However, since it is quite likely that an idle trunk will be available in the final route, calls are not held up by this procedure.

B. With Senders Available for Outward Traffic.

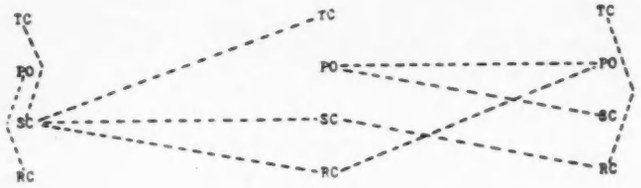


Fig. III—Examples of many possible high usage trunk groups.

This will be the situation at all CSP's and at some ordinary TC's may be selected manually in the multiple and others would be reached through the dial equipment using the senders at the originating point, depending upon the economies in each case. Alternate routing can be obtained through the senders on an automatic basis with a consequent simplification in operating practices. Otherwise, the conditions obtaining under (A) apply.

Extent of Switching Areas

THE BASIC routing pattern is closely associated with the provision of the "final" trunk groups. Since final trunk groups are provided from all ordinary toll centers to their home primary outlets, a call originating and terminating within a primary outlet area does not go outside that area to find an idle trunk to the called point. This can be seen by reference to Chart B. Similarly final groups are provided from all primary outlets to the sectional center and a call originating and terminating in the area served by a sectional center does not go outside that area to find an idle trunk to the called point. A similar situation prevails for calls originating and terminating in the region served by a regional center. In this way routings are confined to areas of manageable size, the geographical area involved corresponding to the needs of the calls. Calls from one area to another must, of course, cross boundaries. Certain intra-area fringe items may also cross area boundaries to save backhaul.

The basic routing pattern further provides that at any given CSP the calls switched should either originate or terminate in the area for which it is the home CSP. Thus a call switched at a regional center should either originate or terminate in that region; a call switched at a sectional center should either originate or terminate in that sectional area; and a call switched at a primary outlet should either originate or terminate in that primary area. (Some modifications in the basic routing pattern can be made as noted later on where desirable in order to reduce backhaul). The maximum number of possible switching points on a call between two primary outlets in different regions is thus four, the two sectional centers and the two regional centers. The bulk of the traffic that is not direct can be switched at any one of the four points as economy or service considerations or both indicate. Similarly on calls between sectional centers in two different regions, the possible switching points for traffic that is not direct are the two regional centers and either can be used as economy or service considerations indicate.

When two sectional centers have a considerable volume of traffic between them and are some distance removed from their regional centers, it is feasible to provide final trunk groups between them and avoid having any traffic between them switched at the distant regional centers. The provision of these extra final groups involves some additional cost for trunks, but other considerations such as conditions at switching points may be controlling. In fact, final groups can be established between any two points where it is felt that the traffic, equipment, administrative or other reasons justify the cost of the extra circuits.

Traffic Items Handled by High-Usage Trunks

HIGH-USAGE trunks cut across the "final" trunk network and can handle on the originating side only calls originating at that point or at dependent points of a lower magnitude (in the descending order: RC, SC, PO, TC) and on the terminating side to the terminating point and to dependent points of a lower magnitude. The situation can be illustrated by referring to Chart C. Thus one of the high-usage groups that might be established would be from SC No. 4 to PO No. 2. This group could handle the following traffic items:

Originating At

SC No. 4, PO's No. 4, 5 and 6
TC's No. 4, 5, 6 and 7 and other TC's Homing at SC No. 4 and PO's 4, 5 and 6 and Vice Versa

Terminating At

PO No. 2, TC No. 2 and other TC's Homing at PO No. 2

It should also be noted that the routings are limited at one end to points regarding SC No. 4 or its dependent PO's as their home CSP and

(*Please turn to page* 52)

Discussion group meets following film on accident prevention. (All photos appearing with this article were provided by The Chesapeake & Potomac Telephone Co., Richmond, Va.)

EFFECTIVE Training Programs Require - Apt Pupils - Good Instructors - Proven Systems

by

ELIZABETH DULL

Secretary-Treasurer

Harrisonburg (Va.) Telephone Company

•

AN effective training program in every department of telephone work is not only desirable—it is essential. The three most important factors in such a program are, an *apt pupil*, a *good instructor*, and *proven methods and equipment*.

In a training program, the first important requirement is, that the instructor have a thorough knowledge of the things he is to teach, and have the ability to get and hold the pupil's interest.

It should be assumed when a person enters the employment of a telephone company, that he has no knowledge about the industry. He should, therefore, be educated to the idea that the foremost aim of the telephone industry is to give service. This may come hard for those who have been dealing with tangible commodities, such as merchandise, where the transaction ends with the sale. This is not true in the telephone company. Here the selling is a continuous process and each employee a salesman, interpreting the company to the public—the operator by her voice and patience; the installer by his courteous and careful manner while working in a subscriber's home or office; the construction worker by his regard and respect for public or private property; and the business office employee by a combination of all—accuracy, courtesy, speech habits, understanding the customer, etc.

Business Office Personnel

BUSINESS OFFICE personnel, to a greater degree perhaps than other employees, represents management to the public, and public relations between the industry and the people it serves is most often based on the treatment received in business office contacts.

In beginning initial training for business office employees, therefore,

that fact should be kept in mind. Because they are called upon to transact a wide range of business and to deal with all kinds of people, the training of business office employees should develop not only knowledge and skill in practices and policies, but a viewpoint and spirit that will enable them to deal with each customer as an individual rather than in a routine manner.

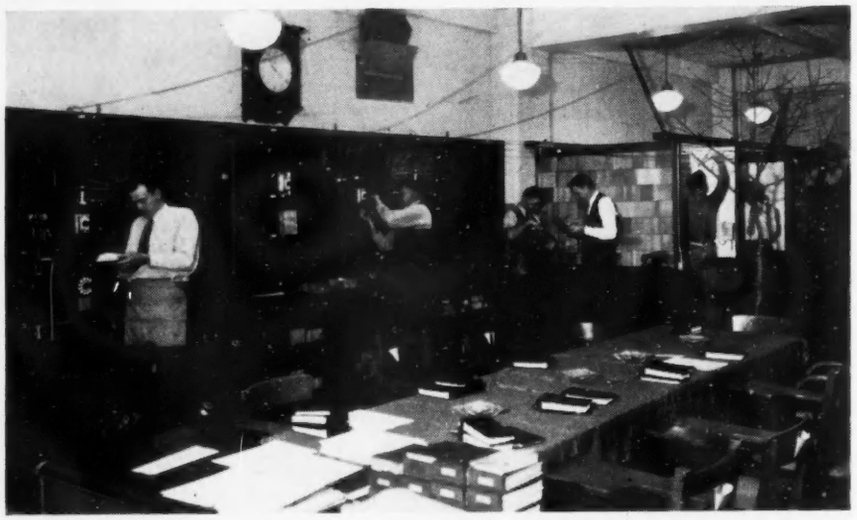
Since there is a limit to the amount of initial training that can be retained, training on the job is necessarily confined to the types of work most frequently encountered, such as simple record work—filing, sorting tickets, etc. It is well to have definite objectives in mind in planning training work and to test the effectiveness by suitable follow up activities, and the employee's questions and opinion. Throughout the training, the student should be encouraged to ask questions, and should be made to feel that his instructor is ever ready to explain the things he does not understand. You will find that the need for helping employees through training never ends, although as they become more experienced, less help is necessary.

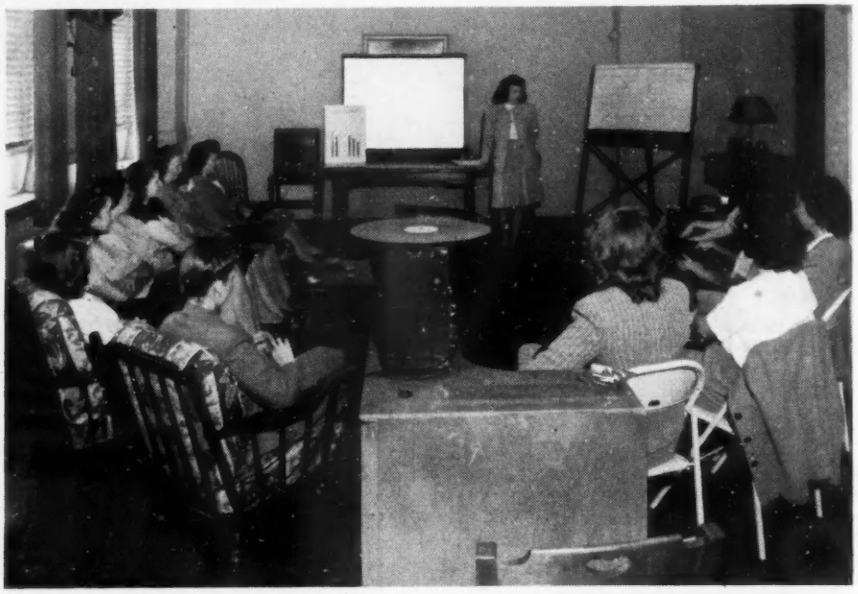
After the initial training period, during which the employee has gotten the "feel" of the job he is to do, he should be given the opportunity to put what he has learned into practice. Learning the work with skill should have been emphasized, and during this period record work should be carried on as far as possible to allow the employee to become self confident. It is the instructor's responsibility to determine the amount of instruction and practice necessary for the individual student to perform the different items of work with a satisfactory degree of skill.

The period of "practice" should then be followed by more advanced training in preparation for handling all phases of business office work. This training should be on the more complicated and difficult items, such as organizing his work, customer contacts, investigation and follow up of complaints, contract orders, directory listings, and toll and service billing.

The importance of accuracy on all record operations should be emphasized at all times, by pointing out its effect, not only on the customer, but also on other departments involved.

There should be available in every business office, a manual of company practices, so that all business office personnel may easily refer to it. This insures uniformity in procedure where policies are involved and eliminates the necessity for running to a supervisor for routine details. It also serves to protect both the employee and the supervisor where questions concerning practices arise.





(Top photo) Installer students practice telephone installations on set resembling actual on-the-job conditions.

(Bottom Photo)—In operators' training class, employees learn fine points of operating.

It is always a good idea when a new employee is taken on in any department to have available for him, also in written form, a brief historical sketch of the company, its service traditions and aims; the opportunity offered for advancement—not only in salary but for promotions; employee benefits, such as the working conditions, pensions, sick and accident and hospitalization insurance. All of this will tend to inspire the confidence and respect of the employee, thereby creating more interest in his work as a part of a great industry.

Not long ago we visited a school being held by a large company for repairmen-installers. On this particular day the entire time was spent on safety training. A film was used to show how to prevent accidents, even minor ones, and to show the results of careless handling of equipment and tools. After the film the instructor and pupils gathered around a table to discuss certain phases of the film, and each man was asked pertinent questions to find out whether he had grasped the meaning of the things shown. From the discussion table the group went on to other illustrations and safety posters, which were fully explained.

This company's plant department has a room in which equipment and materials are set up for demonstration and practice. (See accompanying pictures) As you can see the

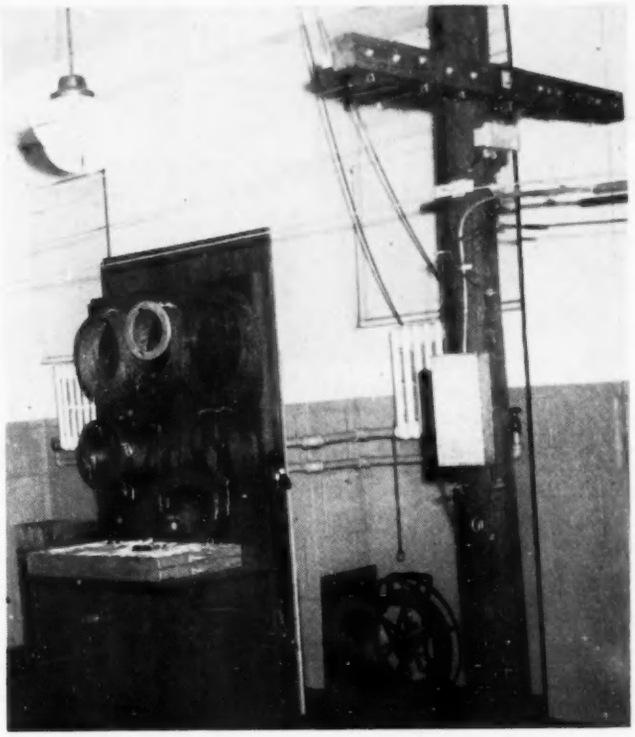
set is assembled to show as nearly as possible all aspects of the work the employee is expected to encounter. By working with this dummy equipment during his training course, he becomes familiar with all the tools, equipment, and materials he will use when he goes out to do the actual work.

This room is used not only for installer-repairmen instruction, but can be converted for use in instructing cable splicing, and line construction.

We asked the instructor in this school if the cost of a set up of this kind would be prohibitive for smaller companies. His answer was, "*no, not when compared to the cost of poorly trained employees who do not know how to handle equipment and tools, and the complaints and criticism of subscribers whose premises are damaged thereby, for which the company is held responsible.*"

Of course, the practicality of such a set up would depend largely on the number of persons a company has to train, but if the number is large enough, this appeared to us to be an ideal method of training.

It is a proven and accepted fact that an employee retains the things he sees more easily than he retains reading matter or verbal instructions. Therefore, training films and slides are used by a good many companies to great advantage. While the initial cost of the equipment is rather heavy, yet we are convinced that in the long run the results obtained outweigh the cost. This equipment can be used in every department and films are now available covering practically every subject.



View of section of room used for training plant department employees.

Operator Training

DURING THE war when personnel turnover was heavy in every company, and facilities for training were short, the need arose for some way to train operators away from the switchboard. From this need came the idea of making a dummy board by taking a picture of switchboard positions, enlarging it to standard switchboard size and mounting it on a frame, with a key shelf.

In the Harrisonburg Telephone Company we found this invaluable for the initial training of operators. On this dummy board the new operator becomes familiar with the multiple, the busy test, and the handling of cords, before she is placed at the actual switchboard. Only after the student has mastered the multiple, cords, etc., is she placed at the regular switchboard and then under strict supervision allowed to take up calls. Of course, the first actual work is done when there is a lull—not during the heavy traffic hours.

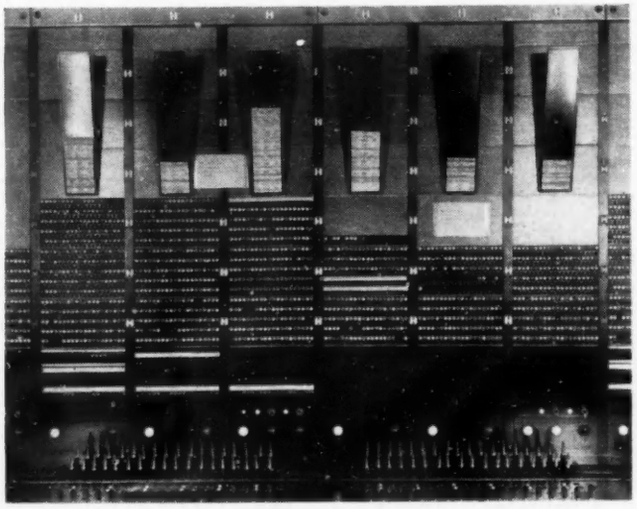
In small exchanges, with one, two, or three position boards, where the chief operator has to be the instructor, the following procedure might be used to advantage.

At the beginning of the first day of training the chief operator should arrange to be away from the switchboard for at least a half an hour to receive the student and to explain the nature of the work to be learned and the general plan of training.

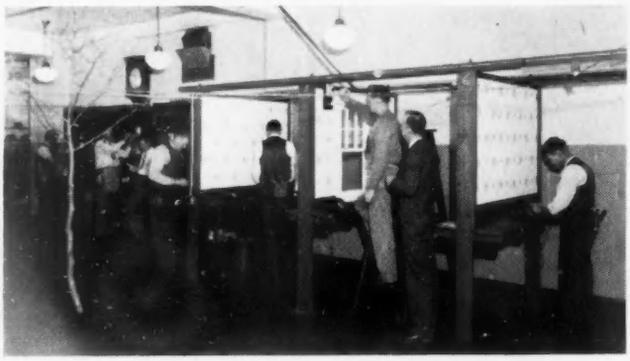
After the introduction, the student should listen in with the instructor while she operates. Whenever the instructor has an opportunity between calls she should explain to the student how various conditions are handled, the arrangement and use of switchboard equipment, manner of dealing with customers, and other matters pertaining to operating.

Since the student cannot learn in one day all the different kinds of calls she observes on her first day of training, some order of learning should be established. It will generally be easier for her to learn locals before toll. This should be explained to the student and no toll instruction given until she has learned the local part of the job.

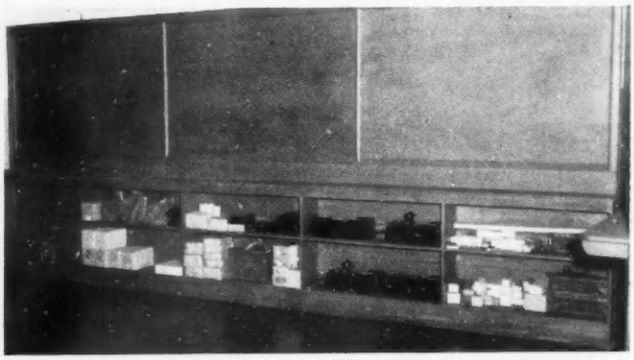
During the first few days it will be helpful to have the student write down names or numbers on local calls as they are received. During



Two positions of Harrisonburg Telephone Co. switchboard from which dummy board was made.



Plant department students learn "by doing" on practical set.



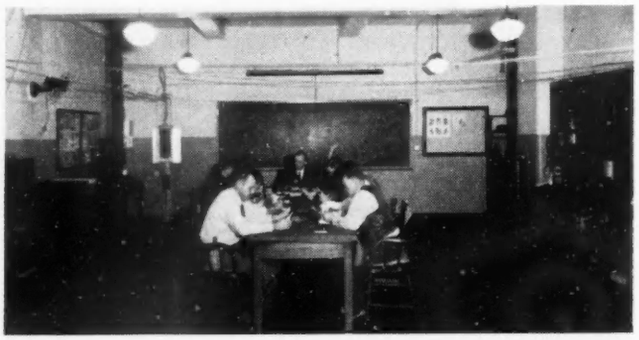
Practice board and shelves used in plant training.

periods when traffic is light the instructor may have the student practice locating numbers by touching the proper jack each time with the plug of an idle cord.

When the instructor believes the student can handle local calls, this should be arranged. If it is possible to group two positions, the student may answer some of the line signals on her own position with the instructor listening in the adjacent position. If the order is for a local number the student may complete it on her position. Calls which the student cannot handle may be transferred to the instructor's position and completed by the instructor. A similar arrangement may be used on one-position boards by having the student use cords at one end of the position. As the student continues to learn new conditions she will be able to do an ever-increasing amount of actual operating.

During the training period the student will learn to a large extent by observing the instructor's operating. Because of this it is most important that the instructor set a good example in her own operating, her dealing with customers and by her attitude and manner as she works.

It is desirable to defer some of the more difficult conditions until after the student has completed her initial training when this is practicable. The new operator will be able to handle calls after completing the initial training period, but will need additional training in order to become an expert operator. The instructor should continue to give this subsequent training according to the new operator's individual needs. However, arrangements should be made so that during periods when the new operator works alone in the office, she will be able to call some designated person for assistance if she encounters a condition on which she needs help.



Students learning proper use of plant manual.

As the student advances to toll training the necessity for accurate, legible and properly timed tickets should be stressed. The instructor should explain the disposition of toll tickets as regards billing procedures and how billing accuracy affects both customer relations and company revenue. This activity should be interwoven with the student's toll training on a continuous basis.

Of equal importance with technical skill is that of telephone ethics, especially secrecy of telephone communications. It is important that the student understand the necessity for secrecy of telephone communications before she listens to actual operating.

The instructor should also explain to the student that in addition to giving service which is accurate and prompt, it is important that this service be given in a manner which is pleasing to customers. Some of the following factors contribute toward leaving a favorable impression with the customer—politeness and sincerity; alert and business like attitude, naturalness and friendliness; helpfulness; adequate explanations.

Throughout the training period the instructor will have many opportunities to discuss individual customer contacts with the student. In her own operating it is particularly important that she demonstrate the best possible manner in her contacts with the subscriber.

The need for intensive training programs in every department of telephone work, cannot be emphasized too strongly. The industry came in for rather severe criticism during the war years because of the lack of trained personnel. Now that the war is over, and equipment needs are being filled, we hope that once again our training programs can be given the number one place on each company's schedule.—THE END.

Students practice on this set to become familiar with correct installation practices.

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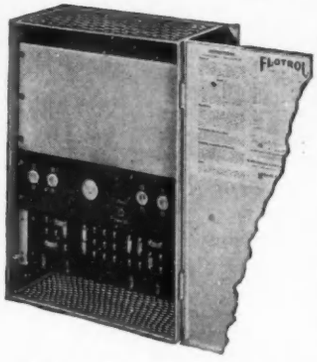

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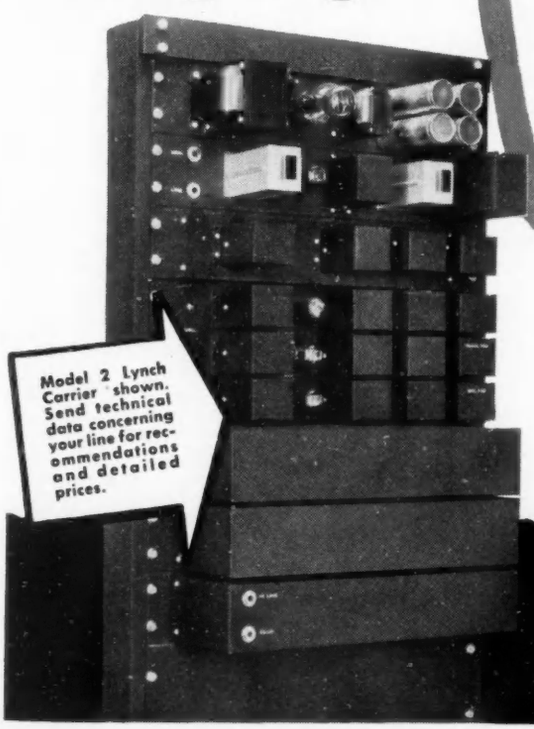
Saved by using LYNCH System	= $47,600

If your plans call for any telegraph or telephone line extension beyond 25 miles you'll save by using LYNCH Carrier Equipment every time!



Model 2 Lynch Carrier shown. Send technical data concerning your line for recommendations and detailed prices.

Operates on a standard dial or ring-down basis

The Lynch Carrier System is the newest and most advanced equipment of its kind. It is easily installed, economical to maintain, and fully automatic in operation. Uses only standard tubes which are available everywhere. Lynch Carriers can double, triple or quadruple the number of voice channels over any pair of copper wires. By adding Repeaters, lines 1000 miles long can be handled. Proven through extensive service with major railroads, independent telephone and oil companies. All Lynch Equipment arranged for standard rack mounting.

LYNCH *Carrier Systems*

3 EXTRA VOICE CHANNELS OVER ONE PAIR COPPER WIRES

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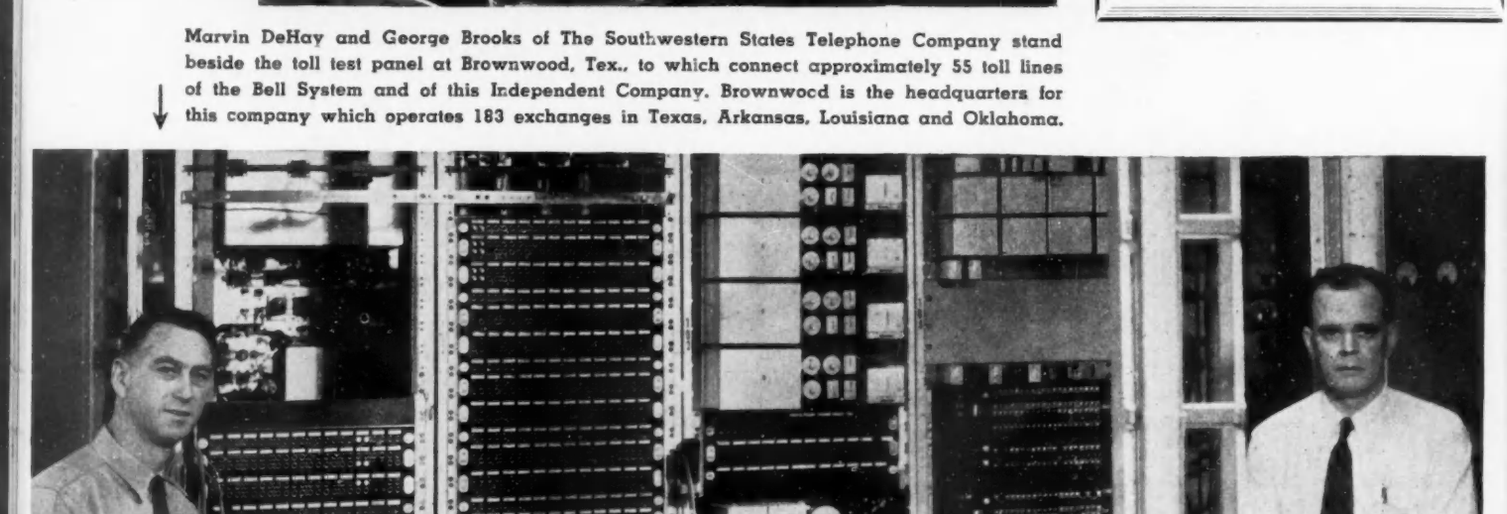
↑ Business office at Cape Girardeau, Mo., headquarters city for the Southeast Missouri Telephone Company which has three exchanges in Illinois and 44 in Missouri. This company has recently established several unattended dial offices, and plans others. Also, it plans a new exchange building and automatic equipment for Poplar Bluff.

← Accounting office in headquarters of the Gulf States Telephone Company which operates 26 exchanges in Texas. Standing fourth from left is Oscar Burton, company's vice president and general manager, who is president of the Texas Telephone Association and a vice president in the United States Independent Telephone Association.

★ TELE-VIEWS ★

→ Switchboard and operating force at Kingfisher, Okla., toll center and state headquarters city of the Western Light and Telephone Company. This company has 102 exchanges in Iowa, Kansas, Missouri, Oklahoma.

↓ Marvin DeHay and George Brooks of The Southwestern States Telephone Company stand beside the toll test panel at Brownwood, Tex., to which connect approximately 55 toll lines of the Bell System and of this Independent Company. Brownwood is the headquarters for this company which operates 183 exchanges in Texas, Arkansas, Louisiana and Oklahoma.



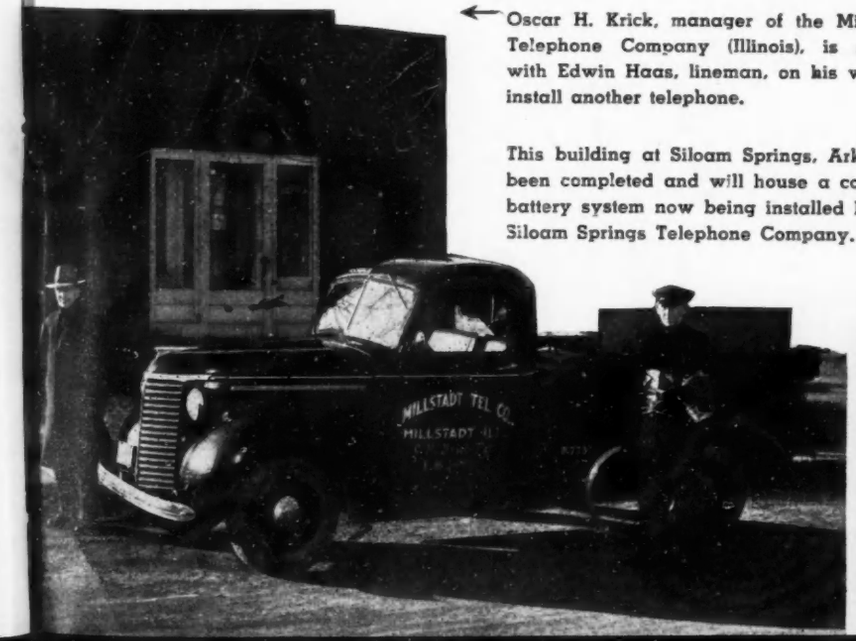
↑ This photograph shows a scene in the public office at San Angelo, Tex., headquarters city of The San Angelo Telephone Company. This company serves, in addition to its headquarters city and the San Angelo Army air field, 18 other exchanges in Texas.

At Columbia, Mo., John T. Hinderks and Russell Johnson work at the test desk. Columbia, home of the state university, is an exchange of the Missouri Telephone Company. (Photos courtesy of Southwestern Bell).

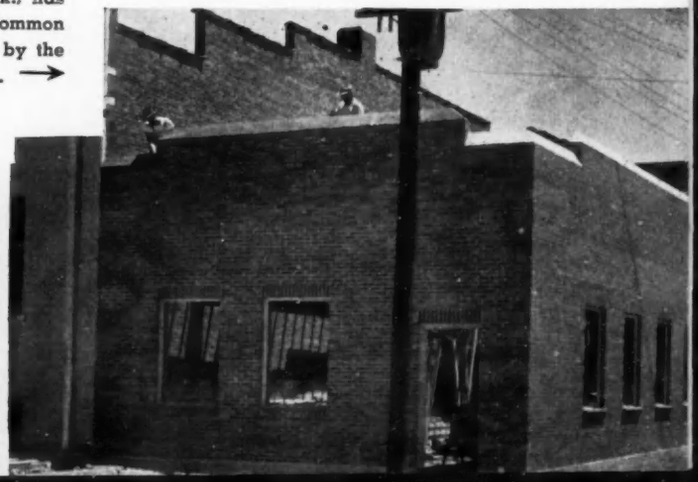
↑ Central office of the Junction City Telephone Company. To care for telephone growth in this Kansas exchange, the company has added three additional toll positions (not shown in picture) and plans to add three more. The office handles telephone traffic for Fort Riley which at a peak period during the war had 50,000 men in training.

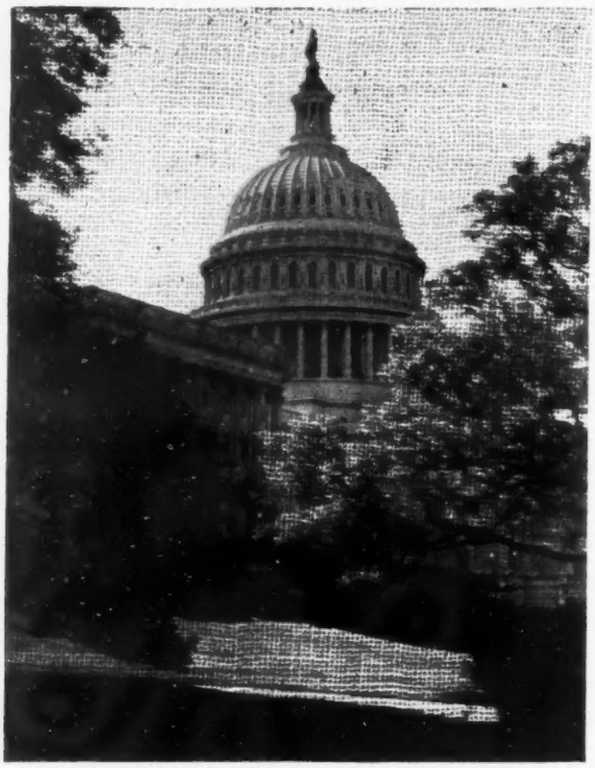
↑ This office of the Boone County Telephone Company at Harrison, Ark., has one of the five toll centers operated by Independent Companies within the state.

← Oscar H. Krick, manager of the Millstadt Telephone Company (Illinois), is shown with Edwin Haas, lineman, on his way to install another telephone.



This building at Siloam Springs, Ark., has been completed and will house a common battery system now being installed by the Siloam Springs Telephone Company. →





★ COURT and COMMISSION Activities ★

Loan Approval Granted Oregon-Washington Company

The Public Utilities Commissioner of Oregon has approved application of Oregon-Washington Telephone Company for authority to borrow $10,000 from Forrest L. Moe, a director.

The proceeds are to be used for the purpose of reimbursing the general treasury of the company for moneys expended for additions and improvements to its telephone system.

◆

Rate Boost Approved For Roseland, Nebraska

The Nebraska State Railway Commission has approved application of the Glenwood Telephone Company, Roseland, Nebraska, for authority to increase rates for service 50c net per month in the Roseland District.

The company proposes an immediate rehabilitation of the plant and plans to install a new switchboard and improve other facilities. Estimated cost of the improvement program is $10,000.

◆

Vacation Rate Approved For Bertrand, Nebraska

Application of the Bertrand (Neb.) Telephone Company, Inc., for authority to readjust the rate schedules for exchange service to incorporate a vacation charge of 75c per month and a connection charge of $1.00 was approved by the Nebraska State Railway Commission.

◆

WHAT THEY'RE SAYING...

Fred S. Florance,
General Manager,
Highland Telephone Co.,
Monroe, N. Y.

"It is inconceivable that telephone managements, efficient and economical though they may be, can be expected to furnish telephone service at current rates and at the same time provide adequate and modern facilities, fair compensation and working conditions for employees, and a reasonable return on the capital required. The plain truth is that the cost of rendering telephone service is rapidly approaching the point, and in a number of instances has already passed it, where more money must be received for that service."

Subscribers Back Rate Hike For Webster, Neb.

Farmers Telephone Company, North Bend, Nebraska, has received authority to increase rates for telephone service 50c net per month at its Webster, Nebraska, exchange.

In its application the company called attention to the annual net loss being sustained by the Webster exchange. The Webster exchange reported a net operating loss, before taxes, dividends, or interest in each case, of $644.61 for 1941, $353.34 for 1942, $109.83 for 1943, $341.50 for 1944, $864.76 for 1945, and $393.11 for 1946. For the first four months of 1947 it reported a net operating loss of $144.10.

From reports on file it was found that wages and salaries have steadily increased. The trend in these traffic expenses is illustrated by the following statistics: In 1941 total traffic expense was $944.; 1942 $1,021.51; 1943 $1,219; 1944 $1,345.; 1945 $1,439.82; and in 1946 it was $1,653.24.

The commercial expense account has risen from the total of $346.78 in 1941 to $1,086.83 in 1946. This trend has been a steady progression upward for each succeeding year.

A petition submitted with the application was signed by 96% of the subscribers of the Webster exchange who favored the proposed changes in rates.

◆

Georgia Commission Reduces Exchange Purchase Price by $7,500

Glenn E. Bryant, owner of the Hinesville (Ga.) Telephone Company has received authority to issue notes aggregating $27,500 for the purpose of making payment for the physical assets of the Hinesville Telephone Company which were purchased from Elmer E. and James E. Kirk.

Under the original purchase agreement, Mr. Bryant proposed to buy the telephone property for $35,000, of which amount he paid $7,500 in cash, the remainder to be covered by notes, the authority for issuance of which was requested. It appeared to the Georgia Public Service Commission that the proposed purchase price was excessive, considering the property which would be acquired, and the commission had its engineering staff prepare a study of the cost and present value of the Hinesville Telephone Company. This study indicated that the value of the property was somewhat less than the proposed purchase price of $35,000. It also developed that there was an indebtedness on the property, payable by the vendors to a previous owner. After considering these facts, the commission notified Mr. Bryant that approval of the application as submitted would not be granted and suggested that the application be amended, whereunder a lesser purchase price would be involved and the outstanding indebtedness on the property cleared.

By letter dated June 2, 1947, counsel for Mr. Bryant, advised the commission that, subject to authorization, Mr. Bryant had executed to Citizens & Southern National Bank, Savannah, Georgia, his promissory note in the principal amount of $18,000 with interest to maturity at the rate of 4% per annum on 75% of the indebtedness, and 6% per annum on the remaining 25% of the principal, the loan being payable in monthly installments of $285.80, the proceeds of which would be used for the payment of the revised purchase price for the property. The remaining $2,000, in addition to the original cash payment of $7,500, is represented by a promissory note in that amount payable to the vendors in monthly installments of $100 each.

The initial cash payment of $7500, plus the note of $18,000 and the note of $2,000 makes the present purchase price of this property $27,500 or $7,500 less than the originally proposed purchase price.

◆

Rate Hike Approved For Petersburg, N. D.

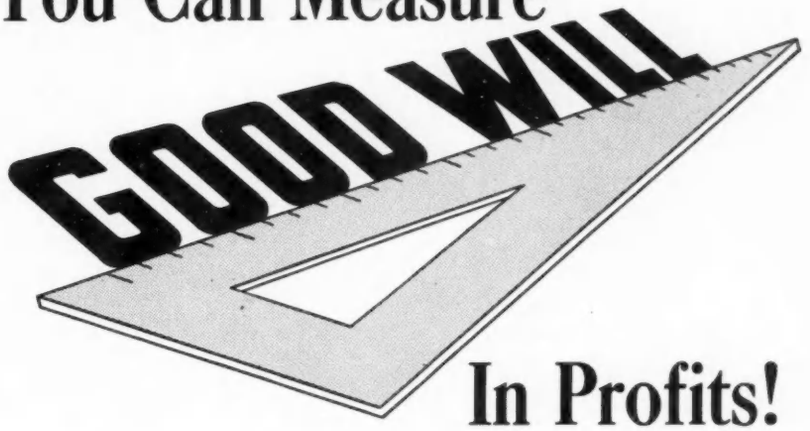
The Flem Telephone Company, Petersburg, North Dakota, recently received authority to increase its rates and charges. The telephone exchange properties at Petersburg and Niagara, are owned and operated by C. C. Flem. The company furnishes local exchange service in the above municipalities and, in rural areas, to approximately 290 subscribers.

Several persons appeared at the hearing to protest the granting of any increase in the company's rates. They objected to the proposed increases mainly on the grounds that present telephone service is unsatisfactory and contended that many present subscribers would discontinue service if rates were increased, thereby reducing value of the service to remaining subscribers. The complaints were mostly concerning unsatisfactory service on rural multi-party lines.

After careful consideration the commission stated it found the company's proposed rates for town and rural residence service would be unjust and unreasonable under existing circumstances. However, this finding is without prejudice to the right of the company to petition for a further increase in such rates after metallicizing and repairing its rural lines. The record indicated that extensive metallicizing will be necessary due to construction of rural electric supply lines in the areas served by the company.

In view of the increase in rates for main station service which was authorized, the commission reduced the additional charge for handsets to 25c per month.

You Can Measure



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Wesley H. Loomis, III, President, and Roland T. Beard, Vice-President, cordially invite your inquiry.

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If you have served independent telephony for fifteen or more years, you are eligible for membership in the Independent Telephone Pioneer Association. This is an honorary association, composed entirely of veteran telephone men and women.

Your friends in this national group are other owners and employees of telephone companies, as well as manufacturers and suppliers of equipment. All of them are people who grew up with the Independent telephone industry . . . who helped build it, who value their friendship and association with other telephone folks, and who have joined the Pioneers to continue these friendships and perpetuate the ideals they helped to establish.

This membership certificate is a thing to be proud of. It can't be bought; it must be earned. Those who are members display it proudly . . . they regard it as true recognition for their many years of faithful service to an industry where service is preeminent.

To become a Pioneer, write for your application blank today. Use the coupon at the bottom of the opposite page.

Mail it to the Independent Telephone Pioneer Association, 2934 Indian Wood Road, Wilmette, Illinois.

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National and State Association NEWS

Wisconsin Association Approves Membership Plan

The Wisconsin State Telephone Association, which held its annual convention in Madison, Wisconsin, May 21 and 22, experienced an unusual gain in membership during the past year. Since the convention a year ago, the per cent of eligible companies who are members of the association has about doubled. Association members now own and operate over 93 per cent of the 700,000 telephones in the State of Wisconsin.

Walter Dakin, president of the Association, suggested a membership campaign to the board of directors and the plan was heartily approved. Early this year member companies were requested to personally interview non-member candidates in adjacent exchanges or areas. Soliciting companies were provided with a summary of benefits of Association membership for distribution to non-members.

In his convention address, Mr. Dakin recommended that a membership drive be conducted every year, since the value of the Association is in direct relation to the proportion of eligible Wisconsin telephone companies which are members.

On the basis of per cent of eligible companies in the Association, the Wisconsin organization has moved up from 17th to 5th among the 31 state associations in the country.

◆

USITA Letter Protests Communications Excise

In a recent letter to each member of the House Ways & Means Committee, Clyde S. Bailey, executive vice-president of the United States Independent Telephone Association, expressed the hope that the committee is planning to give sympathetic attention during the present session of Congress to the plea of Independent telephone companies for repeal of the excise taxes on telephone service and facilities.

Mr. Bailey's letter presented a copy of testimony presented to the committee on May 21 by Harold V. Bozell, Chairman of USITA's Tax Committee.

Photographed during golf outing at New York convention (left to right): W. S. Durland, Chester; E. V. Moran, Albany; John Gunther, New York City, and John D. Ackley, Copake.

Mr. Bailey stated in the letter that USITA had noted "with some concern certain references in the press that an effort might be made at the current session to pass a bill eliminating or substantially modifying the excise taxes on telegraph service alone. The press notices we have seen carried no reference to elimination of the telephone excise taxes."

"We can scarcely believe," he wrote, "that Congress would be guilty of practicing any such form of discrimination as this. To eliminate or modify the taxes on one branch of communication service while leaving other branches untouched would manifestly, in our opinion, be unfair and unjust. It seems to us that Congress must act upon all communication taxes at one time.

"The burden which is imposed on the telephone user by the excise taxes on the calls he makes is as much felt and is as burdensome to him as the burden imposed on the telegraph user by the tax on that service. Indeed, in the aggregate the burden is probably even more keenly felt in the case of telephone subscribers in the Independent telephone industry, for the reason that the great body of such subscribers is made up of residential telephone users; while telegraph customers are predominantly business establishments which can pass the charges they pay for telegraph service along as part of the expense of doing business.

"It is our view that taxes on all communication services are illogical and inequitable because they are imposed on a necessity. As Mr. Bozell pointed out in his testimony before the Committee on May 21, the Ways and Means Committee when reporting out a bill to repeal the World War I tax on communication services back in 1924 stated that this tax is not only "a burden upon business but a tax upon a public utility so widely used as to be a necessity." The 6,000 companies that make up the Independent telephone industry very greatly hope that any repeal or modifying legislation eligible for consideration at the current session will include excise taxes on telephone service. There should not be two bites out of a cherry."

The letter also pointed out the following conditions:

(1) There has been widespread adverse reaction to excise taxes on communication service from telephone subscribers and telephone companies as well.

(2) Excise taxes are a deterrent to the use of telephone service.

(3) Excise taxes on communication service have been resorted to only in cases of emergency and have been repealed when the emergency has passed.

(4) Elimination of the excise taxes on telephone service will assist telephone companies in their program

for extending telephone service to rural areas.

(5) Luxury taxes should not be imposed on necessities.

(6) Communication service is not a luxury; it is a business and social necessity.

(7) Congress should deal with all communication excise taxes at as early a date as possible and at one time, and should not single out any particular form of communication service for preferred attention.

◆

Maine Association Meets Sept. 24-25

Geo. R. Armstrong, program committee chairman, has announced the 1947 convention of the Telephone Association of Maine will be held in the Falmouth Hotel, Portland, Maine, September 24 and 25, 1947.

◆

New York Association Holds 25th Convention

The New York Telephone Association held its 25th annual convention in Syracuse May 21 and 22. New directors elected were: Sheldon Birdsall, Margaretville; S. Fred Nixon, Westfield; C. S. Dudley, Cato, and Harold White, Jamestown. Other members of the board of directors are: Don F. Davidson, Spencerport; Frank D. Fancher, Middletown; Fred S. Florance, Monroe; Louis H. Meyer, Johnstown; J. W. Morrison, Rochester; W. A. Seely, Norwich and Don T. Todd, Edwards.

Officers elected are: President, Mr. Seely; vice president, Mr. White; executive vice president, Allan W. Ryder; treasurer, Leon L. Carter, and secretary and assistant treasurer, Mr. Nixon.

The two-day program was highlighted by the appearance on the speakers' platform of Arthur S. Gibson, assistant general sales manager, Stromberg-Carlson Company, Rochester; Honorable Milo R. Maltbie, chairman of the New York State Public Service Commission, New York City; Clyde S. Bailey, executive vice president of the United States Independent Telephone Association, Washington, D. C.; Dr. Francis J. Norton, research chemist, General Electric Research Laboratory, Schenectady; L. L. Ruggles, chief sales engineer, Automatic Electric Sales Corporation, Chicago; R. A. Johnson, service manager of the New York Telephone Co., Syracuse; J. C. Nash, construction superintendent, New York Telephone Company, Albany; H. J. Prohl, president of Ver-

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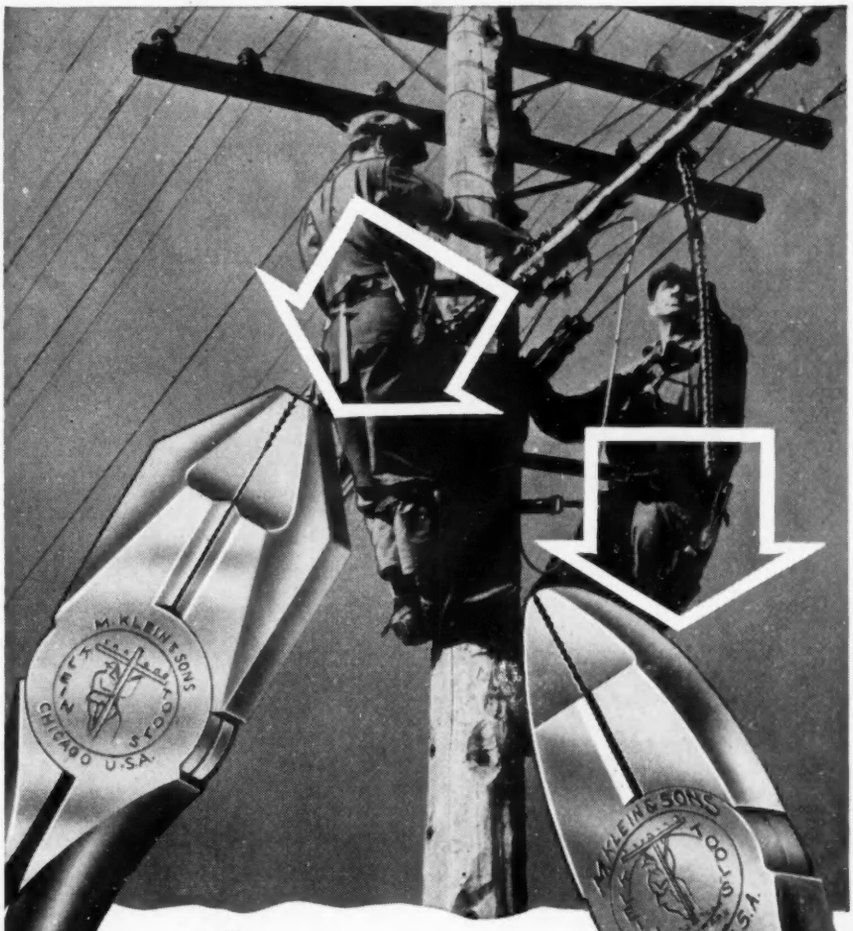

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• Over the years the men who string and maintain the nation's power and communication lines have come to know and rely on Klein Pliers. That's why you will find Klein Pliers in the hands of the man on the pole—why linemen are Kleinmen.

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Keep Klein Pliers on order—your supplier will meet your requirements as soon as possible.

Ask Your Supplier

***Foreign Distributor:* International Standard Electric Corp., New York**

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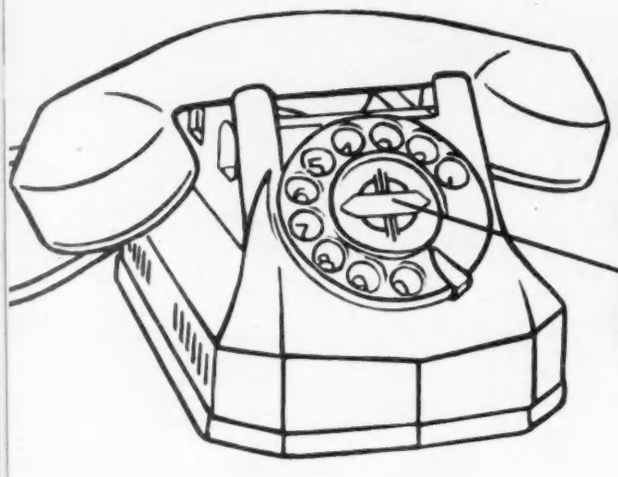
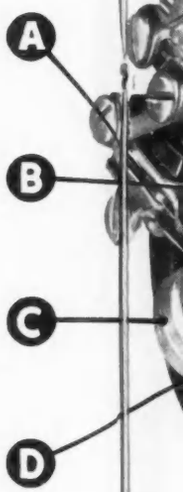


You may never see the "Di

You can use Automatic Electric Dials—and even work with Automatic Electric telephones for many years—without ever seeing the working parts of this important unit. The reason is that it is almost never necessary to remove the dial from the instrument for repairs—or even for inspection. The Automatic Electric Dial is as wear-proof and fatigue-proof as 50 years of dial engineering "know-how" and mechanical ingenuity can make it.

Consider this fact: Automatic Electric Dials taken from stock have been subjected to laboratory tests in which more than 30,000,000 impulses were produced by a single dial! This is the equivalent of approximately 130 years of service at the rate of 25 five-digit calls per day.

Of course, you won't want your dials to serve for 130 years. But you will be glad to know they've proved their stamina in tests like this—and in the test of actual use. Telephone men who have worked with Automatic Electric Dials find that their sturdy construction keeps maintenance to a minimum. Naturally, these are the dials you'll want!



WORKING P TS

A—Impulse spring assembly

B—Main shaft actuates shu cam a "quieted" pawl, ratchet ear an plate.

C—Governor assembly wit fly-ba control.

D—Impulse cam actuates in lse sp sembly.

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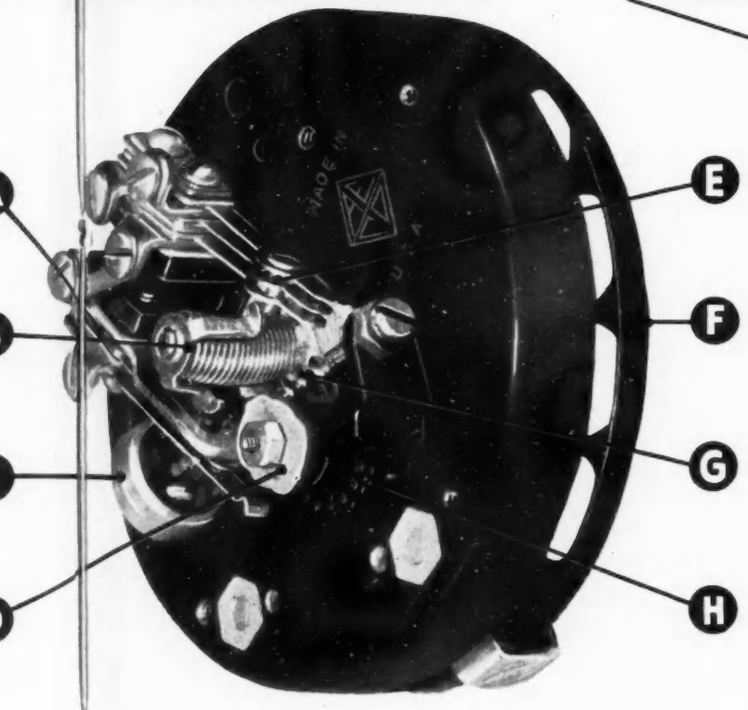

Automatic Electric DIAL

This Automatic Electric Dial has been, for twenty-one years, the acknowledged standard in its field—one of the outstanding developments of the Independent telephone industry.

G P TS OF THE FAMOUS "QUIETED" DIAL

sembly

tes shu cam assembly, ratchet ear and finger

bly wit fly-ball speed

uates im lse spring as-

E—Shunt spring assembly.

F—Flanged finger plate minimizes "fly-wheel" effect.

G—Governor worm turns smoothly on ball thrust bearing.

H—Special laminated pinion gear is self-lubricated, long-wearing.

non Telephone Co., Vernon; H. B. Talcott, supervisor construction methods, New York Telephone Company, Albany, A. F. Bradner, assistant plant manager of the Orange County Telephone Company, Middletown, and J. G. Carritt, plant engineer of the Rochester Telephone Corporation.

President Fred S. Florance, Monroe, touched the general theme of the meeting in his annual address at the opening session on Wednesday morning, when he stated: "While our immediate concern must be to provide service for everyone who wants it, there is an equally important problem that must be solved. Making service available to as many as possible has seriously overloaded facilities and caused an unavoidable deterioration in quality of service. The importance of restoring quality of service and improving it beyond previous standards cannot be overemphasized."

Mr. Florance stated that telephone customers have accepted inferior service only because they believed it was the best that could be rendered under existing circumstances. "Because," he said, "they have accepted it without undue protest, let us not be lulled into a false sense of security. They are entitled to and will ultimately demand the best service and most modern equipment that is practical in their community.

"That its importance has been recognized is revealed by the fact that 52 companies in the state have plans for extensive replacement programs. Many of the plans programs include conversion to dial operation, not only because dial service offers many advantages but also because in many instances it offers the only economic solution."

The report of executive secretary Allan W. Ryder, given at the first session, revealed that the member companies gained 24,745 stations during 1946, while rural telephone increased by 20 per cent. Mr. Ryder urged companies not to delay in filing rate increase applications where the need for higher rates is apparent.

The final speaker of the Wednesday morning session, Arthur F. Gibson, assistant general sales manager of the Stromberg-Carlson Company, Rochester, brought the convention audience up-to-date on "Today's Problems of The Manufacturers."

Mr. Gibson stated that, "by and large, your manufacturer is confronted with the same difficulties that faced him in October of 1946 when, at the time of the National Convention, a group of manufacturers told the convention the problems they were then having. In many instances, however, the problem has become aggravated because another seven months have passed by and the unfilled order pile of the manufacturer is not only larger but many of his customers have had to be told that delivery of the order which they have had on the books for a number of months is not yet 'just around the corner.'"

Fred Florance, general manager Highland (N.Y.) Tel. Co., took the above photos at the golf outing held during New York convention.

Mr. Gibson stated that although the manufacturer is, to some degree, able to secure and quickly train assemblers or punch press operators, he is not able to turn out the volume of work from his factory that he did during war-time because third and fourth-shift operations are not possible except in rare instances because the war-time incentive does not exist.

Manufacturers are also faced with distinct problems when it comes to employing design or circuit or equipment engineers, draftsmen or production engineers familiar with the telephone business. Those functions require men fully versed in telephony and there are very few such men out of work today.

"Many of you," Mr. Gibson said, "are faced with the necessity of converting your plants and you are probably going to an entirely different type of operation, no doubt using equipment built by the same manufacturer but, nevertheless, installing a more modern type of equipment. Wherever that is being done, the load on your manufacturer's Engineering, Drafting and Production facilities is increased proportionately.

"Your manufacturer is keenly aware of the problem which faces you in your effort to serve your subscribers. He knows of the difficulty you are having with the commission because in many, many instances members of the state commissions have visited your manufacturer's plant and have checked the order piles, the progress of this or that order, and have seen first-hand the effort that is being put forth to produce the equipment you need.

"The manufacturer welcomes visits of this type from the commissions because such visits bring out quite strongly that it takes materials, machines, people and time to produce telephone equipment and that no amount of legislation or threats of rate-cutting can be substituted therefor. It was good to see a recent comment in the press that the Florida Commission had made a special telephone report acknowledging to the State Legislature that shortages of material essential to manufacture telephone equipment and supplies are hard to obtain. The Florida Commission, incidentally, was among those which sent representatives into your manufacturers' plants to get first-hand information."

In closing, Mr. Gibson stated that each company could help its manufacturer by making an honest effort to place equipment orders with him as far in advance as possible, thus giving him time in which to properly process the order and, perhaps, make allowance for disappointments in delivery schedule. He recommended that in this emergency period, standard equipment should be ordered insofar as possible.

The next speaker, Milo R. Maltbie, chairman, New York Public Service Commission, told of the work increase of the commission in recent years.

He also detailed activities of the New York commission in bringing about the acceptance of the station-to-station cost basis in computing toll rates (now adopted by the FCC) as opposed to the former board-to-board basis. He told of the attempt by some of the commissions in the south to prevent state-wide rate increases, favoring maintenance of too high long distance rates. The attitude of the New York commission was that state rates should be self-sufficient.

"A Few Notes on Our National Problems," prepared by Clyde S. Bailey, Washington, D. C., executive vice president, United States Independent Telephone Association, was read by Don W. Walker, Clifton Springs, as Mr. Bailey was unable to attend the convention due to a meeting of the House Ways and Means Committee

(*Please turn to page* 48)

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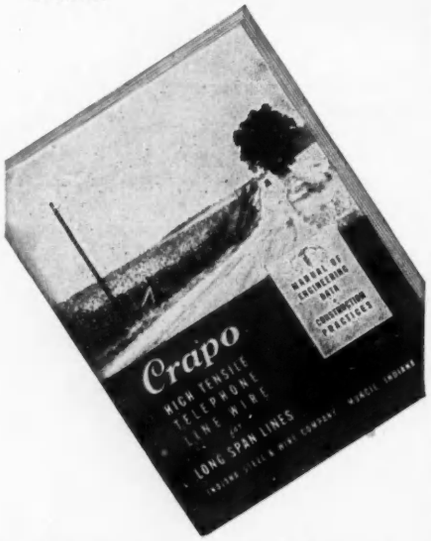

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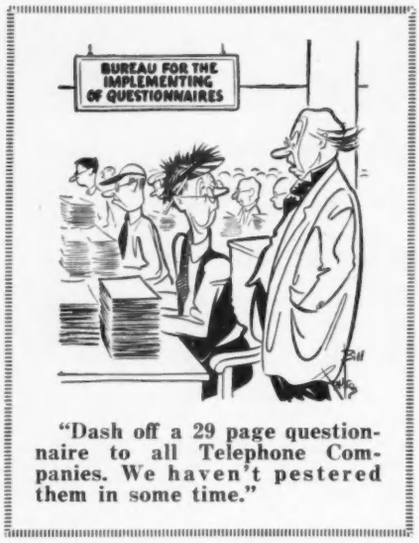
in Washington to consider the telephone excise tax.

The Thursday morning session was opened with Leonard L. Ruggles, chief engineer of Automatic Electric Sales Corporation discussing "The Application of the Strowger Director to Nationwide Toll Dialing."

In reviewing the basic plan of the nationwide toll dialing network as disclosed to the Independent industry by the Bell System, Mr. Ruggles described the various classes of toll switching centers which the plan embraces, including regional centers, sectional centers, primary outlets and ordinary toll centers. He also called attention to the need within the nationwide network for certain types of toll switching centers which are to be known as common control centers, and which will include facilities for registration and translation of toll center dialing codes to provide the sequence of digits necessary to route each call to its destination. The same facilities also provide for the automatic selection of alternate routes in case a busy condition is encountered anywhere along the preferred route.



"Dash off a 29 page questionnaire to all Telephone Companies. We haven't pestered them in some time."

Mr. Ruggles referred to the Bell Crossbar System as one example of common control equipment which is planned for use in certain of the Bell common control centers. He then called attention to the Strowger Automatic "Director", which is a device which converts a step-by-step system into a common control system. The Director, he pointed out, may be applied to any existing step-by-step office, or it may be included as an integral part of a new installation.

To illustrate the functions of the Director in providing registration-translator facilities within a large network, Mr. Ruggles made use of a demonstration unit which consisted of a map, a trunking diagram involving several types of toll centers, and related switching equipment. The demonstration showed how the originating toll operator could set up a connection to any subscriber in the entire network through the use of her impulse key set, and how the Director equipment associated with the demonstration unit translated the code number of the terminating toll center into the proper sequence of pulses necessary to route the call through intervening switching points. He showed also how in the event of certain trunk routes being busy, the Director would automatically test alternate routes and select the first idle route to the terminating point.

The demonstration had the effect of showing clearly that the manufacturers of the Director are alive to the needs of Independent industry for equipment to meet the requirements of the nationwide toll dialing plan and are ready to cooperate fully to provide companies with the necessary toll switching facilities.

At the final session on Thursday afternoon the plant forum, with Louis H. Meyer serving as moderator attracted a large audience. In this forum the subjects of "Cable Spinning," "Central Office Building Problems," "Tools and Methods," "Extension of Cable vs. Open Wire Construction," and "Long Span Construction," were ably presented by Messrs. Nash, Pohl, Talcott, Bradner and Carritt.

◆

Vermont & New Hampshire Hold Joint Convention

Chairmen E. H. Hunter and P. A. Chase, of the New Hampshire and Vermont Public Service Commissions respectively, and Clyde S. Bailey, USITA Executive Vice President, were feature speakers at the annual convention of the Independent Telephone Associations of New Hampshire and Vermont June 18-19 at Lake Morey Inn, Fairlee, Vt. Several New England Telephone & Telegraph Co. officials were also speakers on the program, including general commercial manager J. C. Carraher, connecting company agent E. J. St. Clair, and general traffic agency supervisor H. C. Gay, who spoke on traffic plans for 1947.

New England Telephone and Telegraph Co. auditor of disbursements H. G. Berquist discussed telephone accounting practices and N. B. Thayer, district plant engineer of New England T. & T. reported on pole line construction.

BOOK REVIEWS

Radar Engineering, 644 pages, 6"x9", cloth, 471 illustrations, McGraw-Hill Book Company, $7.00

This book by Donald G. Fink; Executive Editor of Electronics; Formerly Staff Member, Radiation Laboratory, Massachusetts Institute of Technology, and Expert Consultant, Office of the Secretary of War, is an authoritative treatise designed to acquaint Engineers and Radio and Electronic Technicians with the new techniques and with special applications of old techniques used in radio detecting and ranging. It covers theory and practice of radio technology and radar systems developed and used during the war. Design of specific apparatus is covered in detail. With many others, such subjects as pulse generation, pulse transmission, waveguides, transmission lines, propogation of ultra-high frequency and superhigh frequency signals, and components, circuits and structures are thoroughly covered.

The work is presented in two parts. Part I, Radar Fundamentals, and Part II, Radar Circuits and Components. A detailed index affords means of quickly locating the discussion of items of equipment or basic principles. Chapters 1, 2, 3, 4, 5 and 12 are followed by supporting bibliographies. Former service men will recognize the army nomenclature of many items of equipment listed in the index. To the engineer or technician desirous of keeping abreast of the development of this vital weapon the book is an essential part of the library.

◆

Principles of Radar, 887 pages, 6" x 9", Cloth, 565 illustrations. McGraw-Hill Book Company, Inc.

This is a complete and authoritative technical treatise. It covers theory and practice and sets out the mathematics of the subject in a clear and effective manner. The book is a revision and modernization of the original edition which was prepared to afford a sound grounding in Radar principles.

The material is exhaustively presented in twelve chapters under the following titles: Introduction, Timing Circuits, Indicators, Receivers, Magnetrons, Modulators, Triode Transmitters, Radio Frequency Lines, Radar Antennas and Propogation, Wave Guides and Cavity Resonators, Transmit-Receive Sets, Synchros and Servomechanisms. The book is a necessary item for the engineer working in modern communication.

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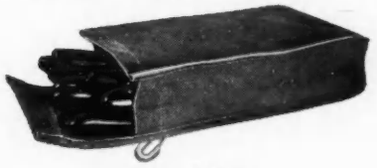

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Do You

BY RICHARD ALLEN

The religious natives of interior China in the 1880's were strenuously opposed to the erection of electric wires because these devices were likely to cast shadows on their hallowed burial grounds.

★

Screen actress Bette Davis has a nursery wired for sound, so that the cries of her new baby daughter may be heard in any part of the house. Must be a weak baby or a mighty big house.

★

Between the 25 largest cities in the United States the average telephone station-to-station day rate is $1.56 today compared with $5.93 in 1920, an example of the marked drop in charges being the present $2.50 rate from New York to San Francisco, compared with $16.50 in 1920.

★

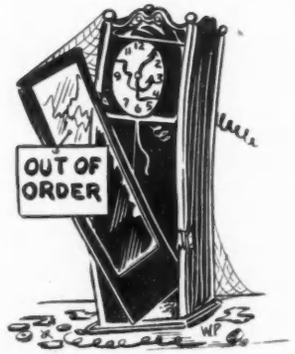
More than a thousand graduates of Chinese universities will be trained in communications systems in the United States and Canada within the next four years and the first group of these Chinese telephone engineers is already studying the methods of the Bell System.

★

Some people never think seriously about anything until they're broke, in jail or in a hospital—or married—or some other disaster has overtaken them.

Know?

ILLUSTRATED BY PAULSON



Twenty-five years ago telephone subscribers reported trouble with their service on the average about twice a year. Now the average is about once every two years.

★

There are more than 200 Independent telephone companies in Ohio with 636 central offices and about 430,000 telephones which connect with the Bell System long distance lines.

★

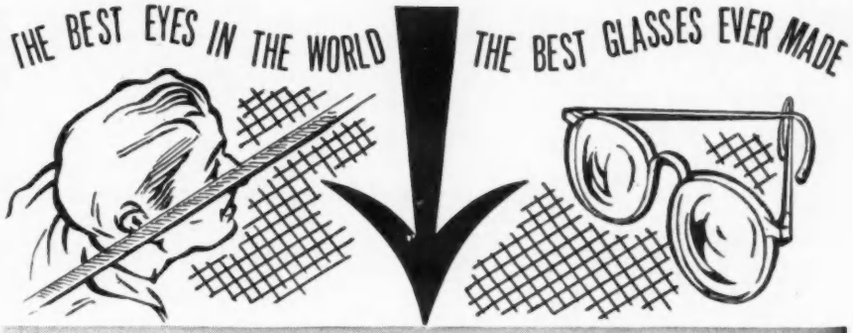
The number of telephones in use in Canada increased from 1,751,923 in 1944 to 1,848,794 in 1945. Business telephones increased by 26,906; residence telephones by 55,013; rural by 14,236 and public pay by 716.

★

Faster, more accurate, more dependable telephone service is today being furnished at relatively less cost to the user than at any time in history. Compared with rates of 25 years ago, subscribers are now saving 250 million dollars annually.

★

Long distance rates are much lower than in 1920. The average station-to-station day rate between the 25 largest cities in the country is down from about $6.00 to less than $1.60. The transcontinental day rate for a station-to-station call has been reduced from $16.50 to $2.50. Overseas rates have been cut drastically since the service was opened in 1927.



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• Crack down as hard as you please—an Estwing can take it and come back for more. Not only that, but they're built with just that delicate touch of balance needed to pack an added wallop into your swing.

Tough? You bet they are! It's the way they're made—the "I" beam construction with laminated leather handle—as shown in the illustration at left.

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Toll Switching Plan For Nationwide Toll Dialing

(Concluded from page 30)

at the other end to points regarding PO No. 2 as their home CSP.

Routings to Avoid Backhaul

THE FOREGOING examples of routings make use of the regular pattern of routes. At ordinary TC's where the toll lines are selected in the multiple it may be desirable in some cases to have the operator route *outgoing* calls to distant points in one direction through her home CSP and in the other direction through another CSP to which a *high-usage* group is available. There are no transmission problems involved because the call takes the regular routings from whichever CSP gets the call.

Referring to Chart C, for example, assume that the first choice route for calls to the West from TC No. 3 is via PO No. 2 over the high-usage group. If the call is to TC No. 1, PO No. 2 has a final routing via SC No. 2, RC No. 1, BC No. 1, PO No. 1 to TC No. 1 which involves fewer links than if the call were routed via PO No. 3, the home PO for TC No. 3. Thus, this route would be satisfactory. However, the reverse routing is not practicable. Thus on a call from TC No. 1 to TC No. 3, if the call were to be routed via PO No. 2 through PO No. 1, SC No. 1, RC No. 1 and SC No. 2 and then the high-usage trunks from PO No. 2 to TC No. 3 were all busy, the standard final routing from PO No. 2 would be to SC No. 2, RC No. 1, RC No. 2, SC No. 3, PO No. 3, and TC No. 3. The call would retrace part of its route and involve nine intermediate links.

This sort of routing is, therefore, undesirable from a transmission viewpoint and is not possible from an equipment design viewpoint. While combinations of incoming routings can be found that would probably be acceptable from transmission and equipment viewpoints, it is felt that these routings are not necessary to the plan, tend to complicate the transmission and equipment layout and administration and should therefore be omitted from consideration, at least initially.

Transmission

The present view is that the average transmission provided under the new plan will be substantially the same as under the present plan but that individual types of calls may be subject to small changes from the present. During the busy hour it is expected that there will be an increase in the volume of switched calls, with an attendant small effect on over-all transmission. On the other hand, it is expected that the provision of additional direct groups will improve transmission during the non-busy hours.

The increase in the maximum number of switches from 4 to 6 is not considered to be important from a transmission viewpoint because 4-wire switches will be used at 4 of the 6 switching points. The percentage of traffic encountering 5 and 6 switches will be extremely small.—THE END.

$70,000 Expansion Program For Prattsburg, N. Y.

Extension of service by the Prattsburg Home Telephone Co., Bath, N.Y., involving approximately $70,000, will be undertaken in the near future according to president Herman Wagner.

The company received a certificate of convenience and necessity from the New York Public Service Commission for the operation of lines in the town of Pulteney, the village of Prattsburg, and in portions of Wheeler, Prattsburg, and Urbana over the objections of the Hammondsport Telephone Co.

The ruling gives the Prattsburg firm the opportunity to set up an automatic exchange at Urbana, which will serve a large portion of the Pulteney area, the west side of Keuka Lake.

It is expected to take about one year to set up the new exchanges due to uncertain delivery of equipment. Automatic telephones will be installed in Prattsburg at an estimated cost of $30,000 and a $40,000 investment is expected to take care of Urbana and outside lines. Funds will be raised through mortgage bonds.

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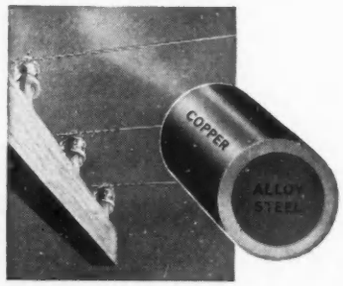
longer spans, better conductivity, and lower maintenance with

copperweld!



Pliable, easily handled, light in weight, economical in cost —only Copperweld combines the high strength and ruggedness of steel with the conductivity and permanence of copper.

Copperweld has the best electrical conductance of any high-strength conductor—is 2 to 3 times stronger than hard-drawn copper wire—has greater tensile strength than any wire of comparable properties.

Its permanent protection against rust means lower maintenance costs, plus good transmission for voice and carrier frequencies during the life of the installation.

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INSURE NO SHEATH CUTTING

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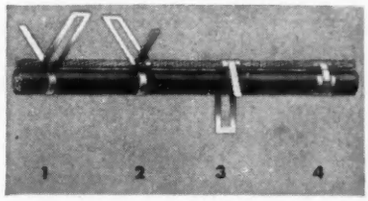
Even badly worn cables hung with Reliable Zinc Cable Hangers will last much longer. The reason is merely that all cable movement that results in wear and sheath cutting is eliminated, because the cable is rigidly bound to the messenger. This is also an added lightning protection—a solid ground is established between messenger and cable.

Reliable Zinc Cable Hangers are strong, economical, and easy to install.



The four simple steps above clearly illustrate the simplicity of a Reliable Zinc Cable installation.

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This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
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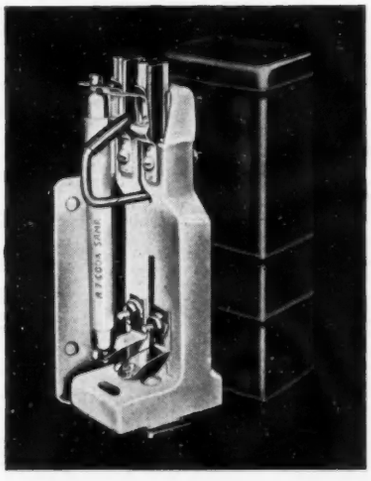
4. Choice of types and lengths of Cook Telephone Fuses.



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Calm, unruffled subscriber service prevails when operators are mentally and physically well-poised.

Operators call the Sturgis No. 435-A "comfortable", unconsciously recognizing that it conserves their vitality. True, its ample Saddle Seat (16½" wide, 14½" deep), and ample Plaited Backrest (8" high, 13" wide), spell comfort. But their infinite capacity for inter-adjustment in height and depth to correctly posture operators of every type of figure is their pay-off.

Heavy, welded steel tubing (1" O.D. for base, ¾" O.D. for footrest), makes Sturgis frames indestructible. Their hair-filled genuine leather upholstery wears everlastingly.

Company, operators and subscribers profit from Sturgis correct design.

Chair Height Specifications

Seat Height Adjustment	Footrest Height From Floor	Seat Height Adjustment	Footrest Height From Floor
18" to 22"	5"	24" to 28"	10"
20" to 24"	6"	26" to 30"	12"
22" to 26"	8"	28" to 32"	13"

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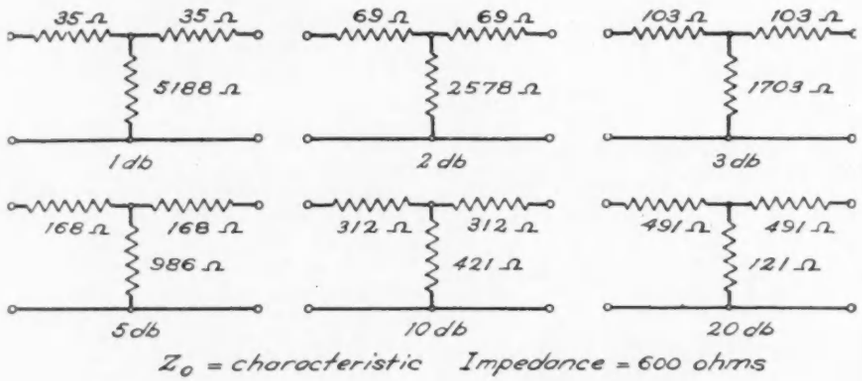
PRACTICAL--

"HOW TO DO IT"

SUGGESTIONS . . .

TRANSMISSION ATTENUATION NETWORKS . . .

TRANSMISSION networks (also called pads) are used for a variety of purposes in the telephone field. A principal use is in the adjustment of telephone repeater gains. They are also used in certain types of telephone transmission testing equipment. Some wire chief's test panels are equipped with a 20 decibel network. This network can be cut into the circuit when testing with a subscriber's station and aids in detecting circuits which have an abnormally high loss.



Resistance Values for a 600-Ohm T-type Pad.

Transmission networks can readily be constructed with radio type resistors. The **characteristic impedance** of these networks should match the impedance of the circuits in which they are inserted. The accompanying illustration gives resistance values for the three elements of a T-type pad for various values of attenuation. The characteristic impedance of the pad shown is 600 ohms.

CABLE SHEATH DAMAGE . . .

COMMON CAUSES of damage to cable sheath and suggested methods of avoiding such damage are as follows:

(1.) *Ring Cuts*: These are usually the result of the cable shifting slightly back and forth within the supporting rings near the poles. The remedy is to use cable hangers or straps which bind the cable closely to the messenger and restricts the lateral motion of the cable. Usually it is necessary to employ the straps only in the first two or three ring positions on each side of the pole. Excessive vibration will also cause ring cuts.

(2.) *Crystallization*: This is usually caused by mechanical vibration from contact with trees or structures subject to continuous movement as in the case of a bridge carrying a heavy traffic. Where trees are involved, the messenger strand may be clamped in a wooden block and the latter fastened to the limb of the tree in contact with the cable to lessen the vibration at this point and keep the cable away from the tree. When only small branches are in contact, wooden cable molding will keep the branches from whipping the cable. Another cause of sheath crystallization is excessive tension of the cable messenger. If the cable rings have slipped, or are missing in places, a loop may be formed in the cable and the sheath may crystallize at the bends in the sheath at this point.

(3.) *Lightning or Power Crosses*: These cause burns or punctures in the lead sheath. Except in the case of direct strokes, lightning damage can be minimized by installing protective equipment at junctions of cable with open wire leads that are more than one-half (½) mile long and connecting the protector ground to the cable sheath as well as to ground. Further protection is insured by bonding the cable to its messenger about every ten (10) poles and grounding the messenger through down guys. In the case of power crosses, bonding the cable and grounding at through down guys will reduce the damage resulting from such crosses. Minimum clearances specified by the National Electrical Safety Code should be observed, so that power crosses will not occur, except under unusual circumstances, as when a power wire breaks in a violent storm and falls on the cable.

(4.) *Gaffing by Workers*: This occurs when a power or telephone lineman fails to exert reasonable caution in climbing past the cable on jointly-used power and telephone poles, or poles carrying both telephone cable and open wire. A guard arm will provide some protection for the cable on jointly used poles, particularly if pole steps leading to the cable terminal are located so that the power man can step off directly on the guard arm.

(5.) *Rodent Damage*: Squirrels gnaw the cable, particularly at locations where they can find a good foothold, as at the ends of a guard arm or cable molding. Reports from various sources lead us to believe that not all squirrels will attack the cable sheath. Usually there is one or two particularly vicious rodents that have developed the habit of gnawing cable sheath at every opportunity. When they disappear from the neighborhood, there is generally no further destruction of the cable, even though many squirrels may be evident.

◆

TENSION SPLICING . . .

TENSION SPLICING, when done in cold weather, minimizes bowing of the cable in warm weather. This is due to the fact that cable contracts at two temperatures and expands at higher temperatures. By pulling up

the ends of cable during the splicing operation all slack is taken out and the cable is placed under tension. This keeps cable bows from forming later on when the weather is warm. This method is not recommended for splicing cable weighing less than two (2) pounds per foot and should be employed in the case of heavier cable only when the temperature of the air is 50° F. or less (30° for spun cable).

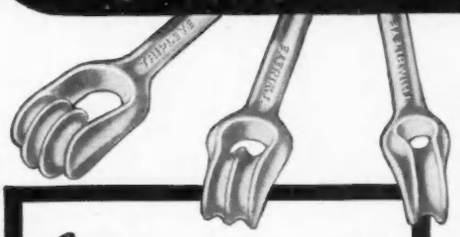
◆

TRANSFERRING CALLS . . .

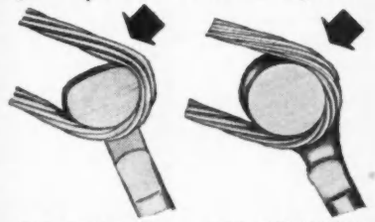
THE practice of transferring calls on a subsciber's request without compensation to the telephone company is quite prevalent in small exchanges. It has a disadvantage of requiring additional work on the part of the operators to transfer the calls and subjecting the company to a legal responsibility when it agrees to make the transfer. Of course, there are situations when a subscriber is justified in requesting a transfer of calls to another number, as when death or serious illness occurs in his family, or he has to be out of town for some time. The company should not, however, be required to transfer calls of a trivial nature. When the privilege of transferring calls is to be discontinued, a policy should be set up in handling requests for transfers of calls and determining circumstances under which a subscriber may be allowed this privilege. All such requests should be referred to the exchange manager, unless a serious emergency requires an immediate decision by the chief operator. If a service order is required for making the transfer and another for discontinuing it, subscribers will usually hesitate to request a transfer, unless they consider it extremely important.

Newspaper publicity before the policy goes into effect, tactfully explaining the reasons for the new policy, will usually bring cooperation from the subscribers. It may be well for the manager to contact business and professional people, who have become accustomed to asking for transfers of calls, and discuss the matter with them. The establishment of a special arrangement, with proper compensation to the telephone company, such as a secretarial service, will often provide these people with a very satisfactory means of transferring their calls and obtaining important messages. In some of the larger dial exchanges, a business subscriber may obtain a transfer key by means of which he can have his line switched to his home to receive calls during the time he is not in the office.

CHANCE Improved THIMBLEYE
Gives GREATER Protection to Guy Strand



Compare these eyes!



OLD STYLE EYE
Notice the strain placed on guy strand when used at angle with old style eye.

NEW THIMBLEYE
The new Chance Thimbleye protects the guy strand from strain at any angle.

FULL ROUNDED EYE . . .
No Kinking at Any Angle
GROOVED to Fit Guy Strand

Chance Thimbleye Anchor Rods, and Guying Fixtures, the FIRST choice of users for many years, have recently been improved by Chance engineers. The redesigned eye forms a perfectly shaped "Thimble" and the sidewalls and groove of the eye extend around the head of the rod. This keeps the strand from flattening under tension, preserves its cylindrical shape and prevents it from kinking at any one point. The sidewalls of the groove are formed to fit snugly around the guy strand, preventing it from flattening under tension.

You will instantly see that the newly designed eye gives greater protection to guy strands than the old style eye.

The Improved Thimbleye is available in threaded rods, Never-Creep rods, and the complete line of guy fixtures.

For greater line security, specify Chance Thimbleye Anchor Rods and get this additional protection. Order through your regular source of supply.

C473-B

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CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA
ABC INDUSTRIES

OLIVER TELEPHONE LINE BOLTS

FROM THE COMPLETE LINE OF
OLIVER POLE LINE MATERIALS

The Oliver Speed Point a real time saver.

The Speed Point—a standard feature of Oliver bolts—is time-saving and waste-eliminating. Oliver bolts are made in all commercial sizes from open hearth steel, and are hot dip galvanized. Types include machine, carriage, double-arming, eye, thimbleye. Write for catalog with complete listing.

OLIVER
IRON AND STEEL
CORPORATION
South Tenth and Muriel Streets
Pittsburgh 3, Pa.

MAKERS OF POLE LINE MATERIALS SINCE 1894

PICTURES OF SPEECH

If it has anything to do with speech, Bell Telephone Laboratories are interested—even to making movies of vocal cords to help design better telephone transmitters. • The advertisement on the opposite page tells the public about this interesting phase of Bell Laboratories research. Appearing in national magazines during July, it shows how far the telephone industry goes to improve its products and service.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

COURTESY OF THE NATIONAL GEOGRAPHIC SOCIETY

Taking moving pictures of human vocal cords

SAY "AH-H-H" TO THE BIRDIE . . . *This Bell Telephone Laboratories scientist is taking moving pictures of the young woman's vocal cords, to get new knowledge about the voice. Such knowledge is useful in telephone transmitter design.*

He is using a Fastax camera, developed by the Laboratories. This camera, the same kind that was used to photograph atom-bomb tests at Bikini, can operate up to the rate of 8000 pictures a second.

Bell Telephone Laboratories learned some interesting things about speech from high-speed pictures of vocal cords.

THE job of Bell Laboratories is to devise and develop facilities which will enable two human beings anywhere in the world to talk to each other as clearly as if they were face to face—and to do this economically as well as efficiently. To this end, Bell Laboratories study everything from the most fundamental matters, such as the mechanism of speech and hearing and the molecular structure of copper wire and rubber insulation, to the detailed design of equipment. The result is better service, at lower cost, for everyone who uses the telephone.

BELL TELEPHONE SYSTEM

Roundtable
LINE and DESK
Discussions

Edited By
J. S. REED, JR.

Q. We are considering converting our magneto exchange to dial. Would we have to improve our outside plant before conversion could be accomplished?

A. It would certainly be necessary to improve outside plant before conversion to dial service could be undertaken. The reason is that conditions that would not greatly affect the use of magneto lines would hamper the operation of common battery or dial equipment, particularly as regards the dialing and ringing functions. Excessive line leakage such as that due to tree grounds must be cleared up. This will usually entail considerable tree trimming work. Bad open wire will have to be replaced with new line wire. High resistance splices will have to be looked for and cut out whenever found. Old drop wire can be particularly troublesome and should be replaced with new wire. Drop wire connections should be checked, especially those made to open wire lines, and defective test connectors replaced. If the open wire lines parallel power lines and the wires have not been transposed, transpositions should be cut in. Noise induction usually has a much more serious effect in common battery or dial lines than in magneto lines.

◆

Q. How should pencil type fuses be mounted in a substation protector?

A. Protector fuses should be mounted with the vent slots in the center facing toward the base of the protector so that, in event the fuses blow, hot metal will not be sprayed over the room. Protectors with separate end mountings require the use of an asbestos mat to protect the wall surface from burns. This mat, of course, is not necessary on the new type of protectors having a solid base.

◆

Q. What is the purpose of twisting cable pairs?

A. Cable pairs are twisted to produce a good electrical balance and to prevent crosstalk between adjacent pairs. The length of each twist varies with the size of cable conductors. In the case of No. 22 gauge cable, the twist is about 3 inches long.

◆

Q. What method should be used to properly support cable on a pole that is out of line with other poles in the lead?

A. In situations where a cable pole is slightly out of line with other poles as at a street or alley corner, a steel extension arm will adequately support the cable as shown in Figure 1.

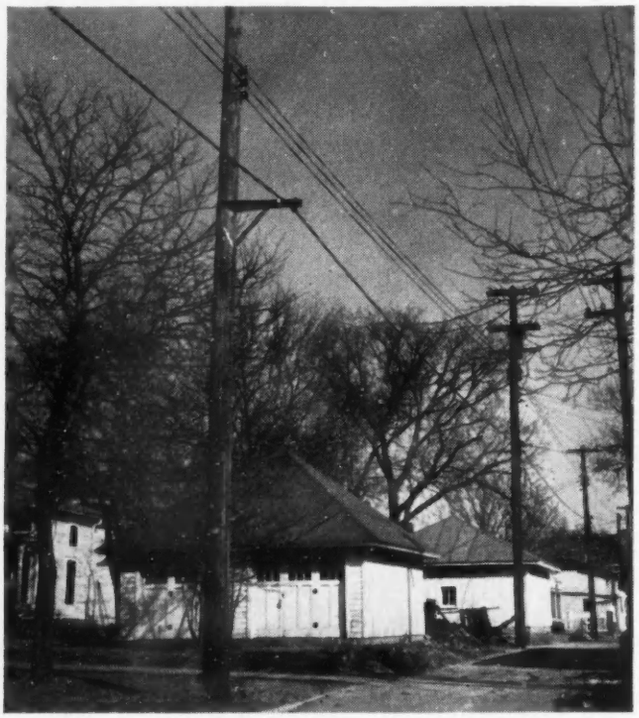

Fig. 1—Showing use of steel extension arm on offset pole in cable lead.

◆

Q. Is it advisable to paint crossarms?

A. No, crossarms should not be painted. An oil paint would seal the pores of the wood. In wet weather, moisture would gradually seep into the interior of the wood through weak places in the paint covering and be retained, causing rapid decay of the crossarms. On the other hand, although an unpainted arm will soak up moisture in rains, it will dry out readily in clear weather. Decay will take place only over a very long period of time.

◆

Q. What is the reason for the requirement that anchors for pole guys be placed with the eye of the anchor rod protruding 6 inches or more out of the ground?

A. If the anchor of a pole guy is so placed that the eye of the rod is buried in the ground or banked over with earth, there is danger of corrosion taking place at the point of contact between the rod eye and the strand which ultimately would weaken the latter and cause it to give way.

P. M. Ferguson Outlines Conditions in the Industry

The increasing demand for telephone service and the inability to secure the much needed equipment to meet this demand were recently pointed out by P. M. Ferguson, general manager, at the annual meeting of stockholders of the Mankato (Minn.) Citizens Telephone Company.

In his report for company directors, Mr. Ferguson outlined conditions generally in the telephone industry, calling attention to the need for central office, cable and pole line equipment in the face of a growing demand for telephone service.

The Mankato company, he said, is affected by shortages of equipment in the same way that all telephone companies in the country are.

"During the war years," he continued, "extensions and additions to telephone plants were restricted by government orders, and now the enormous backlog of orders on file with manufacturers cannot be handled adequately because of labor and raw materials shortages.

"As a result, production has not caught up with demand; and it will be some time before it does, due to the increasing number of orders for equipment from telephone companies."

As an illustration of how the Mankato company has been affected, Mr. Ferguson said that 2,321 telephones had been installed in the period from January, 1940 and that, in view of the fact that no additions to the plant were permitted facilities have all been exhausted.

Other business at the meeting included the unanimous reelection of four stockholders whose terms had expired. Frank Sheehan, John Gerlich, George Pass and P. M. Ferguson were renamed as directors for three-year terms.

The board of directors of the company met following the stockholders meeting. S. B. Wilson was reelected president; P. M. Ferguson, vice president and general manager; W. D. Willard, secretary and treasurer, and W. C. Blethen, attorney.

P. M. Ferguson, Jr., was named engineer and assistant manager, while F. T. Gauthier will continue as plant superintendent.

Directors discussed the problems with which the company is confronted. These problems, it was shown, will call for an extensive expansion of the company's plant in Mankato and the rural districts in order to provide facilities to meet the growing demand for telephone service.

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TELEPRENE BRIDLE WIRE,

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TELEPRENE DROP WIRE, is now available

with *LongLife* NEOPRENE jacket with

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New installations are now being made with this New Trouble Free Bridle Wire.

For MODERN systems that "Stand the Gaff" specify The Whitney Blake unbeatable combination.

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- PLASTITE (INSIDE, JUMPER, DUCT) WIRES

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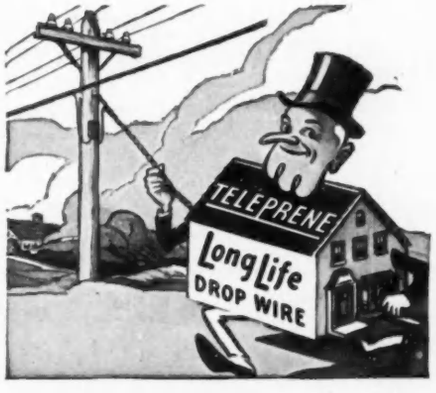

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GraybaR Distributed by GraybaR ELECTRIC COMPANY

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

New Foam Extinguisher For Large Vehicles

The newest in fire extinguishers is reported to be the splash-proof Foamite Firefoam for vehicle service, recently announced by American-LaFrance-Foamite Corporation, Elmira, N. Y.

The extinguisher has a sealed stopper construction built into the top which, according to the manufacturer, prevents the chemicals from mixing until needed. Just

New splash-proof Foamite Firefoam extinguisher.

a twist of the wrist releases the seal and the extinguisher is ready for action.

Except for carrying straps, the new Foamite fire extinguisher is similar to the Foamite fire department type carried on fire engines.

It is claimed that extinguisher is ideal for tank trucks and other large vehicle units because it produces a fire-killing chemical foam equal to approximately 10 times its own capacity and capably stops oil and gasoline fires and prevents reflashing.

The unit has Monotype seamless drawn shell construction and is tested to 550 lbs. pressure. With a steam range from 35 to 40 feet, it is stated the foam can reach fires beneath the truck body as well as all other surfaces. In common with all foam type extinguishers, the new Foamite vehicle unit requires protection from freezing.

◆

Ohmmeter and Wheatstone Bridge In One Portable Instrument

The James G. Biddle Co. has just released Bulletin 21-60-which illustrates and describes the "Bridge-Meg" type of "Megger" insulation and resistance tester.

Engineers, electricians and maintenance men in every industry who have the responsibility of all types of electrical equipment, should welcome the

★

New Products Showcase

★

versatility of the "Bridge-Meg" instrument. It is designed for use on insulation resistance tests and for all manner of coil, resistor and circuit measurements.

Bulletin 21-60-43 fully illustrates and describes all phases of the instrument and its application on a variety of types of tests. You can obtain your copy on request to James G. Biddle Co., 1316 Arch Street, Philadelphia 7, Pa.

◆

Mines Spiral 4 Cable For Carrier Transmission

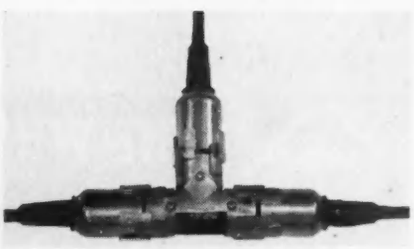
During the war our Signal Corp. used Mines Spiral 4 Cable for carrier transmission. Approximately 200,000 miles was used in the air, on the ground, under water and under ground.

Today it is being used with excellent results in the following fields:

(1) As an emergency cable to bridge gap in signalling and communication systems caused by storms, fires, floods, etc.

(2) In new construction of communication lines, it is serving most efficiently as a temporary jumper across old lines that must be killed while the new line is being constructed.

(3) Temporary emergency lines to isolated spots are quickly and efficiently completed as the latch type connectors make Spiral 4 circuits weather proof. Many other uses should come to mind in this connection.



Mines' BH 6182 Connector

Spiral 4 is regularly supplied on steel reels for storage and transportation. It should be born in mind that complete connection to wires on pole lines must be made to a short length of Spiral 4 with Mines standard connector attached. Some means such as potheading should be employed in connecting the Spiral 4 wire to the lines to prevent water from wicking down the stub in wet weather.

The cable itself is of a four quadded conductor No. 18 insulated type with an electrical shield of foil paper further protected mechanically and electrically by a piano wire woven shielding and covered finally by flame, oil and weather resistant DuPont Neoprene.

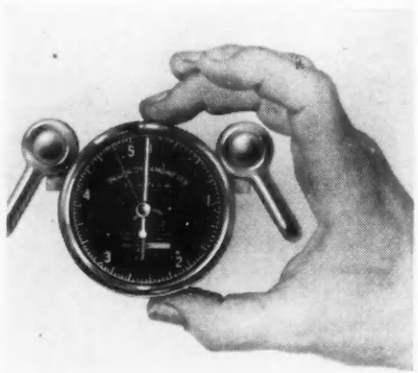
As to price, bought in sufficient quantities, present price, subject to change without notice, is only an average of 5c a foot or less.

◆

New Miniature Dynamometer For Communications Work

Communications engineers have long expressed a need for an exceptionally light weight dynamometer. In announcing the new Dillon Model "C" instrument, W. C. Dillon & Co., Inc. claim to have developed the perfect answer to this problem.

Since most telephone or telegraph wire is of small diameter, ordinary dynamometers cause it to sag unneces-



Dillon Model "C" Dynamometer

sarily when readings are being made. The new Model "C" unit weighs only 1 pound and measures 3" in diameter. It has been perfected especially for the

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WE CAN SUPPLY
THE WORK YOU LACK,
by reason
of shortages in
Manpower
over the coming
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We have the men,
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Give Her the BEST

Give Her *Runzel*

Switchboard Cords

Yes, your switchboard operator has enough "headaches" without being hampered with obsolete equipment. She deserves the never-failing dependability that Runzel Switchboard Cords invariably give.

There is a Runzel Quality Cord to fit any type plug for any type switchboard. Standard colors are red, white and green. Standard lengths 4, 5 and 6 feet. Other lengths and colors can be furnished to order.

Rely on Runzel Cords for switchboard, receiver, desk stand, hand set, operator and transmitter.

RUNZEL
CORD AND WIRE CO.
4727 WEST MONTROSE AVE.
CHICAGO, ILLINOIS

telephone and communications field.

The Model "C" is available in 100 lb., 250 lb., and 500 lb. capacities. It is planned to sell it at a price considerably under that of the company's line of Model "AN" Dynamometers. The Model AN as most engineers know, is intended for placing messenger and guy strand at proper tension and is a heavier instrument.

The dial and hands of the Model "C" are protected by a non breakable lucite crystal. Internal mechanism is die cast of special Zomac No. 3 alloy to permit accurate and uniform assembly. All parts are heavily plated and painted to prevent weathering or rust.

An important feature of the Model "C" is its ability to take on an accidental overload. A special release feature permits such overloads up to as much as 25% without injury to the calibration. The instrument proper will take **better** than a 100% overload without rupturing. This makes it possible to allow even "green" hands to use the instrument safely.

A complete 20 page Dynamometer catalog and data on wire stringing can be had by writing directly to W. C. Dillon & Company, Inc., 5410 W. Harrison Street, Chicago 44, Illinois.

◆

New, Featherweight Aluminum Ladder

The Aluminum Ladder Co., Carbis St., Worthington, Pa., has announced a new featherweight model aluminum ladder, economically designed for light industrial, home and farm uses.

Designated as Model DLL, this new ladder weighs slightly over 1 lb. per ft., and is safe for a 250 lb. load. Advantages of the new ladder lie in the fact that aluminum will not rot or rust. In addition, it can be washed or scalded frequently without impairing its strength. Rungs are corrugated for safe footing. Sizes range from 6 ft. to 16 ft. lengths, and two of the 8, 10 and 12 ft. length ladders can be joined to form an extension ladder.

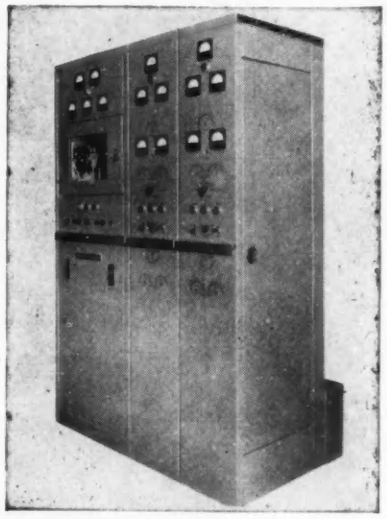
New, featherweight aluminum ladder.

The New Products Editor will send literature and complete information on request.

◆

Westinghouse 3 KW Radio Transmitter

Efficient long distance telegraph or telephone is provided by a new, high frequency, point-to-point, 3 KW radio transmitter now available from the Westinghouse Electric Corporation. Rated at 3 KW on CW operation and 2.5 KW on voice operation, the equipment is designed for use in public service, private net, shore-to-ship, press service and government services communication.

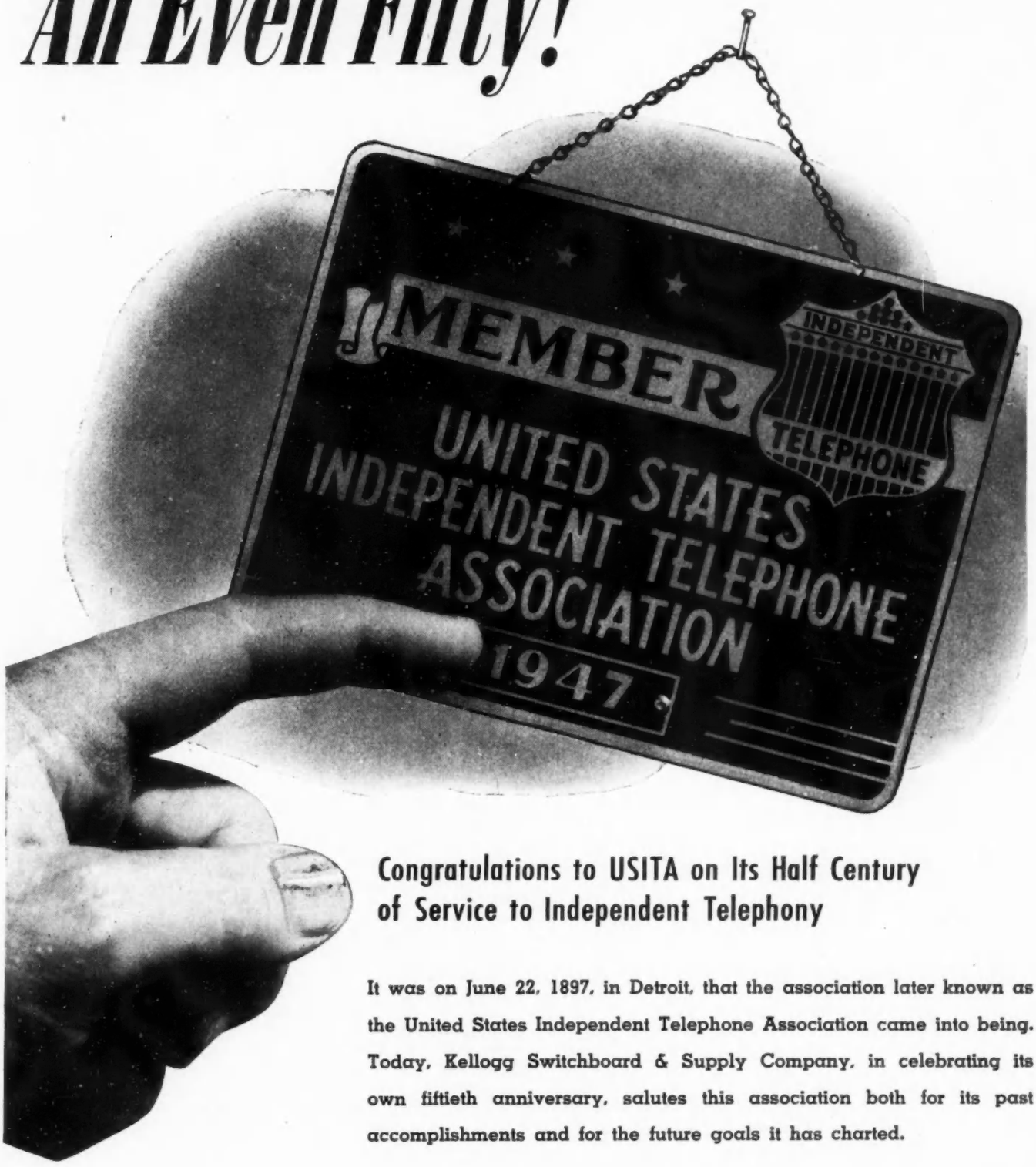


Westinghouse HF point-to-point radio transmitter.

The new transmitter is of all aluminum cubicle construction consisting of radio frequency unit, modulator and rectifier which may be assembled in a variety of combinations suitable to individual station requirements. In addition to the usual features of Westinghouse transmitter equipment, the point-to-point transmitter is moisture-proofed for reliable continuous operation under humid tropical conditions or in salt sea atmosphere.

The radio frequency unit designed for an output load resistance of 60-80/600-800 ohms, operates at frequencies from 2 mc to 20 mc on the radio frequency amplifier principle. The excitation is supplied from a separate crystal

"An Even Fifty!"



Congratulations to USITA on Its Half Century of Service to Independent Telephony

It was on June 22, 1897, in Detroit, that the association later known as the United States Independent Telephone Association came into being. Today, Kellogg Switchboard & Supply Company, in celebrating its own fiftieth anniversary, salutes this association both for its past accomplishments and for the future goals it has charted.

Kellogg extends the hope that these future goals will be achieved with the same spirit of enterprise that has carried this association through past years to its present place of importance in independent telephony.

KELLOGG SWITCHBOARD & SUPPLY COMPANY

6650 SOUTH CICERO AVENUE, CHICAGO 38, ILLINOIS

oscillator or a frequency shift exciter through a 70-ohm coaxial cable.

The modulator provides an audio fidelity of plus or minus 1db over the range of 200 to 4500 cycles. The rectifier, operating from a power supply of 210/230/250 volts, 3 phase, 50/60 cycles is designed for continuous operation at rated power of 2 radio transmitters and 2 modulators at 100% modulation or equivalent.

Further information may be obtained direct from TELEPHONE ENGINEER & MANAGEMENT.

◆

Rome Cable Corp. Issues Cable Manual

Recognizing the need for up-to-date information, Rome Cable Corporation, Rome, New York, has just published the Rome Cable Manual of Technical Information. Planned as a service to engineers and wire men; and, designed as a concise and compact reference in the solution of problems related to wire and cable applications, the manual contains over 250 pages of time-saving tables, data, and calculations. It represents the first attempt in several years to bring up to date such material for presentation under one cover.

A partial list of the manual's contents includes: wire and cable technical tables, engineering calculations, audio and radio frequency wire and cable data, National Electrical Code data, properties of materials, mathematical tables, conversion tables, general technical information.

Published in handy pocket size, the manual is available at $2.50 per copy. Copies may be obtained by sending check or money order to Rome Cable Corporation, Rome, New York.

◆

Chisel-Type Percussion Bits Have Kennametal Cutting Edges

Kennametal Inc., Latrobe, Pa., manufacturers of hard cemented carbide products, sold under trade name of "Kennametal", have announced that a new and revolutionary percussion bit for drilling holes in hard rock has been added to their line of Kennametal cutting and drilling tools. The bit has a chisel type design, a hard wear-resistant Kennametal cutting edge, and it is driven by pneumatic percussion drilling machines.

Until the present percussion bit was announced by Kennametal Inc., the manufacturer states that no cemented carbide bit had been developed that would withstand the impact of air hammers using air pressures of 80 to 120 pounds per square inch—the usual high pressures in American rock drilling.

Carbide tipped masonry drills are offered by Union Tool Co., Detroit, Mich., in both boxed sets and kits. A size chart is included with each.

Kennametal has termed this bit revolutionary because of its miraculous drilling performance on many tough rock drilling jobs in different parts of the country. For example, the manufacturer reports a total of 50 feet of holes 1-⅜" in diameter have been drilled in solid granite with one of these bits before it was taken off the driving rod because of wear. Holes sizes at the end of drilling this many feet of granite were approximately the same as when the holes were started. It was conservatively estimated that holes were only 1/32" smaller in diameter after drilling the fifty feet of granite. By removing the bit and resharpening it, the bit would be good for more footage. Equally as amazing, according to the manufacturer, is the fact that the new percussion bit drilled the granite at the rate of one foot per minute. Other examples as impressive could be cited where the Kennametal percussion bit was used for drilling quartz, silica sand, limestone, and many other hard substances.

Kennametal Percussion Bit before and after drilling 50 feet of granite.

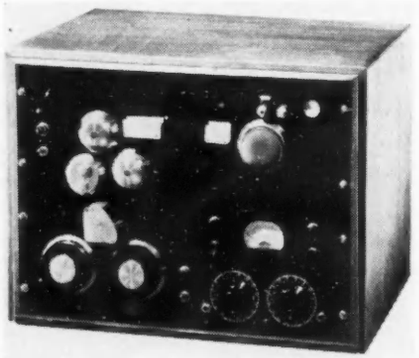
Kennametal percussion bits are economical to use from several standpoints. Namely, less compressed air is required, the periods of operation between bit changes are much longer, and the speed of drilling can be more than doubled. Water holes in either bevel eliminate any danger of clogging while the bit is drilling wet holes; however, dry drilling can be done effectively and economically.

◆

Magnecord Announces New High Fidelity Wire Recorder

The first high fidelity wire recorder to be produced in this country was announced recently by Magnecord, Inc. The instrument incorporates the principles developed in recent years by the Armour Research Foundation of the Illinois Institute of Technology.

Designed for professional users, the Magnecord Model SD-1 has a frequency response flat within 2 db from 50 to 12,000 cps with a signal-to-noise ratio of well over 45 db.



Magnecord Wire Recorder.

The recording media for this custom-produced unit is stainless steel wire .004 inch in diameter. However, the unit utilizes a capstan drive system to drive this wire across the heads at four feet per second. This design assists greatly in the elimination of wow and flutter and produces constant wire speed.

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C&L FIREPOTS
and **BLOW TORCHES**

Where the job is tough and tools have to take a lot of punishment, C&L Fire Pots and Blow Torches always give top performance. Rugged construction and quality materials add up to heat tools that can take it . . . under any conditions. For over 50 years, C&L Fire Pots and Blow Torches have been the first choice of thousands for dependability and long life. At leading jobbers everywhere.

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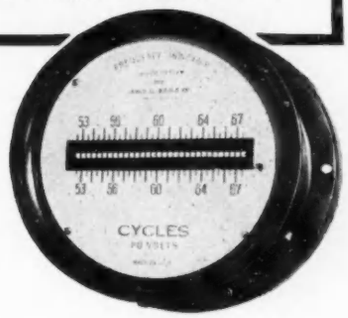
"Frahm"
RESONANT-REED
FREQUENCY METERS

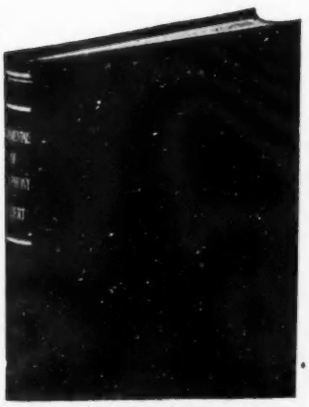


Accurate, dependable and sturdy . . . easy to read . . . little maintenance . . . operates in any position . . . no wave form errors . . . applicable to interrupted d.c. as well as to a.c. Available in switchboard, miniature or portable types in various ranges between 15 and 1500 cps. Write for *Bulletin 1770-TE.*

James G. **BIDDLE CO.**
ELECTRICAL & SCIENTIFIC INSTRUMENTS
1316 ARCH STREET • PHILADELPHIA 7, PENNA.

A Simple, Up-to-the-minute Guide to Telephone Fundamentals

to give you the groundwork you need for best results in practical work



This first new telephone book in years tells how modern telephone systems operate, giving the electrical theory and the technical information on equipment and circuits that will be most helpful as a foundation for the non-engineering worker in telephone installing, servicing, etc.

FUNDAMENTALS OF TELEPHONY

374 pages, 5½ x 8½, 200 illustrations, $3.75

This book provides the telephone worker with an understandable treatment of the technical aspects of his work, valuable as a key to better results and improved skill in any job he may undertake. The fundamentals of electricity and acoustics are covered, followed by a full elementary treatment of telephone equipment and circuits, their elements, characteristics, functions, etc., illustrated by many numerical examples.

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Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

OAK BRACKETS

Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

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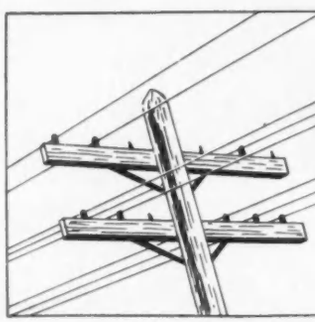
COLUMBUS 6, OHIO

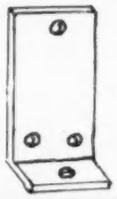


TELEPHONE ENGINEER Handbook Tables

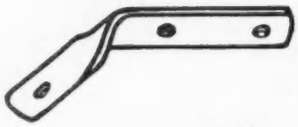
Subject: MATERIAL USED IN INSTALLATION OF DROP WIRE

Index—Drop Wire Installation
Date—July 15, 1947

Table No. 2 is a continuation of Table No. 1 and describes fixtures used for supporting drop wire spans from pole or cable messenger to building and drop wire runs on buildings.

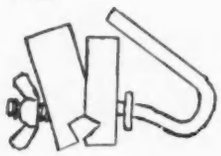


BRACKET, HOUSE — For use at first point of attachment with "S" knobs in multiple drop wire runs.



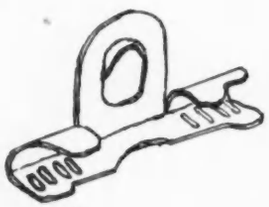
BRACKET, CORNER—For use in turning corners at first point of attachment or inside corners in drop wire runs.

CLAMP, TYPE A SPAN—For supporting drop wire span from messenger of ring supported cable.



CLAMP, TYPE B SPAN—For supporting drop wire span from messenger of spun cable.

CLAMP, DROP WIRE—For attaching drop wire to points of support.



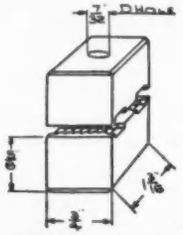
CLIP, DROP WIRE—For attaching drop wire at intermediate points of support in pole-to-pole spans.

HOOK, DRIVE—For attaching drop wire to pole.

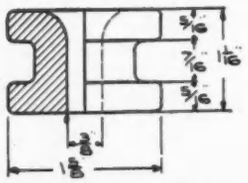
HOOK, GUARD ARM—For attaching drop wire to guard arm. Requires two 9/16" x 1⅜" round washers.

HOOK, DROP WIRE—For fastening drop wire to masonry wall at first point of attachment. Requires 5/16" x 2¼" hammerdrive anchor.

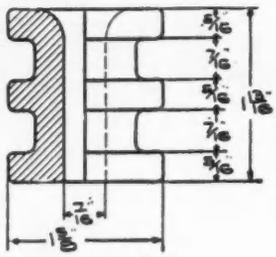
RING, BRIDLE—For supporting drop wire runs at intermediate points and last point of attachment on masonry walls.



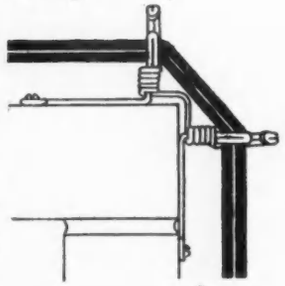
KNOB, TYPE C—Split knob for fastening drop wire at intermediate points in wire run.



KNOB, TYPE S—Single-groove knob for wall or angle screw mounting at points of first attachment.

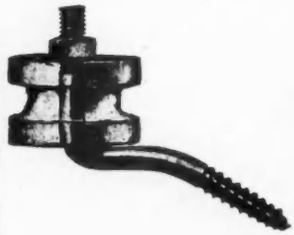


KNOB, TYPE T—Double-groove knob for wall or angle screw mounting at points of first attachment to support two drop wire spans where no ice loads are likely to occur.



RING, CORNER BRIDLE—For supporting bridle wire runs at outside corners.

RING, TOGGLE BRIDLE—For supporting bridle wire runs at intermediate points on hollow tile walls.



SCREW, ANGLE—For use at point of first attachment to building wall when angle between span and wall is greater than 30 degrees.

SCREW EYE, INSULATED—For supporting drop wire runs at turns in run on frame or stucco walls. Type with ⅝" hole provided for up to six wires; and type with 1" hole, for more than six wires.

A pinch of dye makes them live

. . . on and on and ON!

Prolonging the life of capacitors made of impregnated paper and metal foil was an interesting problem solved by scientists at Bell Telephone Laboratories.

Not so long ago all-linen paper was considered best. Then it was found that paper made from wood pulp stood up longer under heat and direct voltage. Evidently something in the wood was helping to preserve life.

Through painstaking experiments researchers discovered that certain chemicals possessed the same life-extending quality . . . made wood pulp paper even better.

Now—by using wood pulp paper and adding a touch of *anthraquinone*, a dye intermediate, to the impregnating compound—they have increased the life of Western Electric capacitors by years and years!

Such infinite attention to detail is typical not only at Bell Laboratories but also at Western Electric, where telephone equipment is built for a long life of highest quality performance.

Western Electric

TELEPHONE APPARATUS AND CABLE

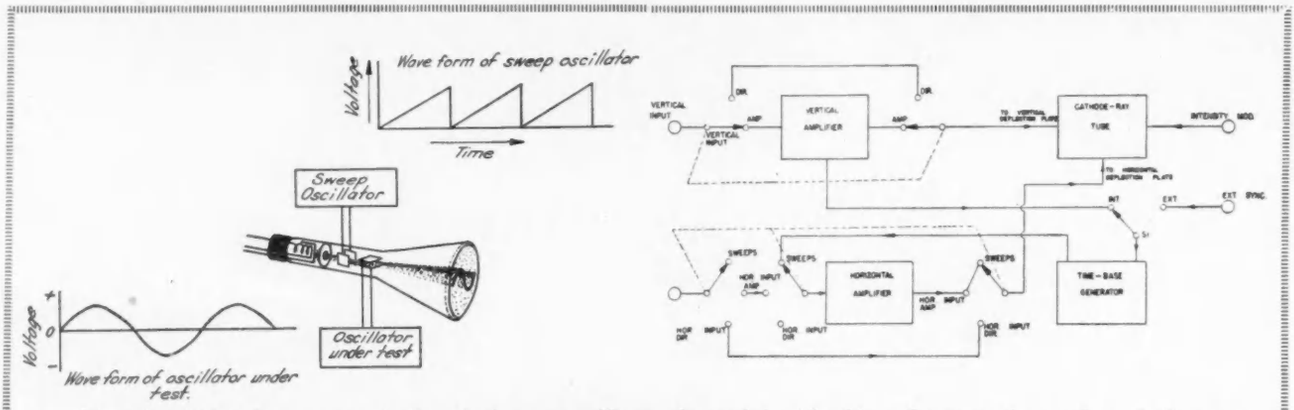


Fig. 27—(left) Arrangement of cathode ray oscillograph used for checking the wave form of an A-C source. Fig. 28-1—(right) Block diagram of the Type 274 Dumont Oscilloscope.

Modern TESTING INSTRUMENTS

by

B. C. BURDEN

(In Part V of the series on "Modern Testing Instruments," Mr. Burden discusses cathode ray oscilloscope circuits.)

THE extent of the vertical deflection is proportional to the input voltage being measured. By proper choice of sweep frequency with respect to the frequency being measured the shape of the a-c wave appears on the screen and can be examined.

The sweep circuit provides a linear time base and consists of a variable frequency oscillator with a "saw tooth" output wave. The elementary circuit of Fig. 27 shows how the tube operates when used in conjunction with a sweep circuit for the purpose of examining the wave form of an a-c source.

Cathode Ray Oscilloscope Circuits

THE POWER supply circuit for a cathode ray oscilloscope must have an output of several thousand volts but the d-c required at this voltage is very low. The Dumont Type 274 oscilloscope (this unit well adapted for telephone testing purposes) has a self-contained sweep circuit with a frequency range of 8 cycles to 30 kilocycles. Amplifiers are provided for both the vertical and horizontal plates and have a gain sufficient to give a one inch deflection on an input potential of only 0.65 volts (RMS). The input impedance of the oscilloscope is about 5 megohms. A block diagram of the Type 274 oscilloscope is shown in Fig. 28-1 and a simplified schematic of the tube circuit in Fig. 28-2. In the telephone field the cathode ray oscilloscope is useful for the following purposes:

(1) Measurement of ringing machine frequency, checking the frequency of transmission oscillators, etc.

(2) Examination of wave form of ringing machines and tones.

(3) For use for wave form analysis or as a high impedance voltmeter in connection with inductive interference investigations.

(4) As a high-impedance vacuum tube voltmeter for special

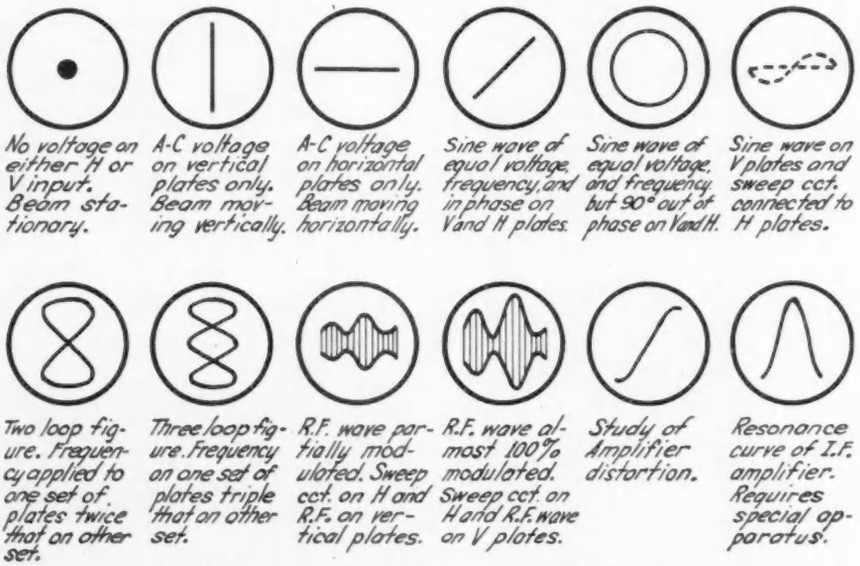

No voltage on either H or V input. Beam stationary.
A-C voltage on vertical plates only. Beam moving vertically.
A-C voltage on horizontal plates only. Beam moving horizontally.
Sine wave of equal voltage, frequency, and in phase on V and H plates.
Sine wave of equal voltage, and frequency but 90° out of phase on V and H.
Sine wave on V plates and sweep cct. connected to H plates.
Two loop figure. Frequency applied to one set of plates twice that on other set.
Three loop figure. Frequency on one set of plates triple that on other set.
R.F. wave partially modulated. Sweep cct. on H and R.F. on vertical plates.
R.F. wave almost 100% modulated. Sweep cct. on H and R.F. wave on V plates.
Study of Amplifier distortion.
Resonance curve of I.F. amplifier. Requires special apparatus.

Fig. 29—Typical patterns obtained on a cathode ray oscilloscope screen with various voltage combinations.

measurement work.

(5) For use in checking modulation characteristics of radio telephone transmitting equipment.

(6) For use in checking distortion in the output of telephone repeaters.

(7) For use in lining up carrier telephone channel equipment.

Cathode Ray Oscilloscope Patterns

SPACE DOES not permit a lengthy discussion of the different patterns that result from various input voltage combinations. In general, the screen patterns may be considered as of

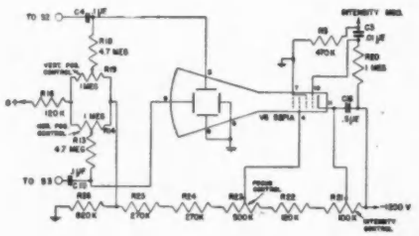


Fig. 28-2—Simplified Schematic of Type 274 tube circuit.

three general types, namely: (1) patterns obtained by applying a voltage to only one set of deflecting plates in which case the width of the deflection pattern indicates the magnitude of the applied voltage, (2) patterns involving the use of a sweep frequency on the horizontal plates. This permits the examination of a-c wave forms by applying the voltage from the source to be examined to the vertical plates, (3) Lissajous patterns, in which known and unknown voltage sources are connected to the two sets of plates and the resulting patterns can be used to check the value of the unknown frequency. Fig. 29 illustrates typical patterns obtained with the several methods.—

TO BE CONTINUED

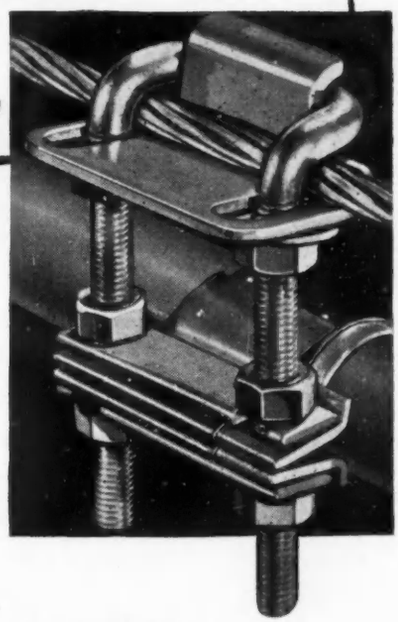
Continue with Part VI of Mr. Burden's article on "Modern Testing Instruments" in the August 15 issue of TELEPHONE ENGINEER and MANAGEMENT.

◆

Central Telephone Company Stock Issue Approved

The North Carolina Utilities Commission has approved application of Central Telephone Company for authority to issue and sell 5000 shares of $2.50 cumulative preferred stock without par value but with stated value of $50.00 per share.

"Cable Slippage Ended-
When We Installed
KEARNEY
GRADE CLAMPS"



That's what all users of these efficient, economical clamps have said. Kearney Grade Clamps are adjustable to any spacing of the cables and the messenger. Long bearing surface, free from sharp edges, gives firm gripping pressure without injuring the cable. It's easy to install this one-piece unit because bolts and nuts are not taken apart for the placing operations. Available in single and double length clamps for either one or two cables.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

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SOLDERING IRONS

Telephone workers and repair men depend on American Beauty soldering irons for their quick, safe heat — safe because every American Beauty iron must pass an insulation breakdown test of 1100 volts.

From the 50-watt lightweight for precision work to the 550-watt utility iron, there are five work-convenient sizes — each a safety-tested American Beauty. Pyramidal or chisel-type tips of pure bar copper are easily interchangeable to suit each job. Select the iron you need from the Automatic Electric catalog.

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The true cost of drop wire is its cost ***per year of service, installed.*** That's why Gencatel is your best buy in drop wire. Numberless tests in the laboratory and in the field have shown that Gencatel outlasts wire with other types of insulation; once up, it's up for years!

Install Gencatel for all new drops and replacements, and you'll soon find your annual drop wire costs starting downward.

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DROPS ARE . . . GENCATEL

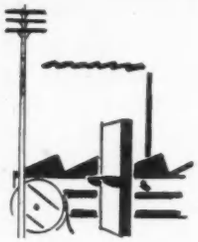
The FORTIFIED Drop Wire

Soaked by driving rains and high humidity—baked in summer—frozen in winter—fortified Gencatel takes it all in stride! Here is one drop wire that will outlast years of hard service and hard weather. Use it for new drops and replacements, to cut drop wire maintenance costs. And in the event of removal or installation changes, just take it down and use it again!

Gencatel drop wire is jacketed with pigmented polyethylene, a resin-base plastic that is made specifically for electrical insulation. Because of its high dielectric strength, only a minimum thickness of insulation is needed—extrusion-molded around the conductor to form a solid, one-piece covering. Hence, Gencatel is light in weight and inherently flexible. Yet it's ***fortified*** against moisture and abrasion, heat, and cold, and against acids, alkalies, oil and grease. Gencatel drop wire is TOUGH!

Try Gencatel on your next order for drop wire. It is available, with #17 bronze conductors, in either parallel or twisted pair construction.

Suppliers' News Briefs



Carl H. Price Joins Stromberg-Carlson

T. C. (Tommy) Thompson, Stromberg-Carlson telephone sales manager, has announced that Carl H. Price of Lawrenceville, Ill., has joined the telephone and switchboard sales staff and will cover the territory of east Texas and Louisiana. Mr. Price will work out of the Stromberg-Carlson Kansas City office.

His 20 years' practical telephone experience in installation and exchange work are regarded as a great asset in his new position. He has successively been associated with the People's Telephone Union of Maryville, Mo., the Hanamo Telephone Company of the same community, and the Suttle Equipment Co., Lawrenceville, Ill.

As field agent for the Suttle Equipment Company he traveled the states of Iowa, Nebraska, Missouri, and Kansas.

◆

U. S. Rubber Issues Booklet on Building Wire

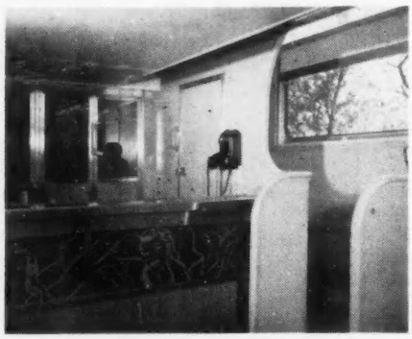
The wire and cable department of United States Rubber Company has published a handbook on Aluminum Building Wire. The booklet emphasizes that aluminum wire is now on a par with copper in regard to quality and that it offers an economical advantage because of low production costs. It points out further that aluminum is in plentiful supply while copper continues to be scarce. The booklet contains tables showing the relative weights of various size aluminum and copper conductors.

For a copy of the booklet write to the Wire and Cable department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

◆

"Train of Tomorrow" Features Automatic Equipment

With a host of technical improvements and refinements to insure maximum comfort and safety of passengers, the General Motor's "Train of Tomorrow" is a miracle of modern transportation that has recently been making the headlines and picture pages in newspapers throughout the country.



Automatic Electric Monophone in the Cocktail Bar of Observation Car.

Automatic Electric Sound-Powered Monophone in the Engineer's Cab.

Fittingly enough, modern telephone equipment finds an important place among the hundreds of conveniences that distinguish this train from most of those of yesterday. A mobile two-way radio telephone permits passengers, while speeding over the rails, to establish telephone communication to home or office, or even to ships at sea. Another telephone provides direct connection to city lines while the train is at its terminal.

Of particular interest, because of its several novel features, is a seven-station automatic intercommunicating system which provides telephone service for the use of the train crew throughout all cars of the train and to the GM Diesel locomotive.

Designed and manufactured by Automatic Electric Company, Chicago, this system makes use of the sound-powered hand-set which served the Armed Forces so well during the war, and which operates entirely from voice waves and thus requires no external source of current to the transmitter. Otherwise, the telephones are very similar to Automatic Electric's standard wall Monophones.

Unlike most automatic systems, this installation has no central automatic switchboard. Instead, each telephone has its own control mechanism which serves not only to select the station to be signalled, but also automatically locks out all stations not in use while a conversation is in progress. The various stations, numbering seven initially, are connected together by a 5-conductor train line throughout all cars and the locomotive, and by 6-conductor inter-car "jumpers". One result of this novel scheme is to provide a high degree of standardization of the telephone apparatus and complete flexibility for the interchange, omission, or addition of cars in the train, to ease in replacement of any telephone unit.

The control equipment for each telephone receives its d.c. power from the regular 32-volt power plant with which each car is equipped. The system handles one call at a time and has an ultimate capacity of 45 stations. To make a call the user merely lifts the handset from the cradle, listens for dial-tone, and then dials the single figure representing the number of the called station. The buzzer at the called station sounds continuously until the call is answered, all of the stations are then locked out of service until the handsets of both stations are replaced at close of conversation.

First practical work-out of the new telephone system was made during the train's initial test run made on May 17, from Hammond, Indiana to Wallace Junction in the same state—a distance of 400 miles for the round trip. Throughout the trip, the telephones were used extensively by representatives of the Pullman and General Motors organizations and were found to measure up to all expectations. The buzzer was plainly audible anywhere on the called car, and transmission quality was excellent at any train speed, which at times exceeded 90 miles per hour.

The "Train of Tomorrow" is sched-

uled to tour the country for a year on exhibition to give both railroad people and the public generally a preview of the newest achievements in safety, comfort and luxury in passenger transportation.

◆

American Coach & Body Adds To Executive Staff

Allen T. Greiner, executive vice president of The American Coach & Body Co., Cleveland, Ohio, has announced additions to the executive staff. This move has been long contemplated as a part of an overall plan of growth and development of the company and rounds out all phases of management, production, accounting, sales, and engineering of the Company.

Robert W. Hadley was appointed president and Harold F. Smith treasurer; both were elected directors.

Mr. Hadley began his career in the machinery business in 1916 with the Toledo Machine & Tool Co., rising from machinist to vice president in 15 years. When E. W. Bliss Company acquired Toledo Machine & Tool Co., Mr. Hadley was appointed chief executive officer in charge of the plant, a position he held 15 years.

Mr. Smith started his business career with Willys-Overland. After World War I in which he served two years as a sergeant, he trained in accounting and office administration and joined Toledo Machine & Tool Co. in 1929, as auditor. He became a director in 1931 and was elected secretary-treasurer.

During World War II, Mr. Smith served as personnel director of the five plants of E. W. Bliss as well as being a member of the Regional War Labor Board of Cleveland.

American Coach recently completed an expansion program, which included a new building and revamping of production lines for the purpose of increasing the output of utility bodies.

◆

Automatic Appoints Regel Mgr. of Facsimile Sales

Appointment of Keith A. Regel as manager of facsimile sales for Automatic Electric Sales Corporation has been announced by H. F. Lello, President. Mr. Regel was formerly executive assistant to the president.

Earlier this year announcement was made that Automatic Electric had acquired rights under Finch Facsimile patents to manufacture, and to sell or lease, Finch Facsimile equipment; and, in his new capacity, Mr. Regel now assumes charge of all sales and promo-

(*Please turn to page 77*)

Back Up Your Crews

with DICKE

POLE LINE TOOLS

"They're Built for Hard Work"

PIKE POLES
PEAVIES
CANT HOOKS
CARRYING HOOKS
PAYOUT REELS
POLE SUPPORTS

Pole line crews pin their faith on Dicke tools — depend on their safe, sure strength in the pinches. There's a tough, reliable Dicke pole line tool for every construction need — for every job where danger lurks. Give your crews the extra safety factor of these Dicke tools:

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FULL LENGTH TREATED NORTHERN WHITE CEDAR

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PENTA

They are clean and dry—easy to climb — safe for linemen.

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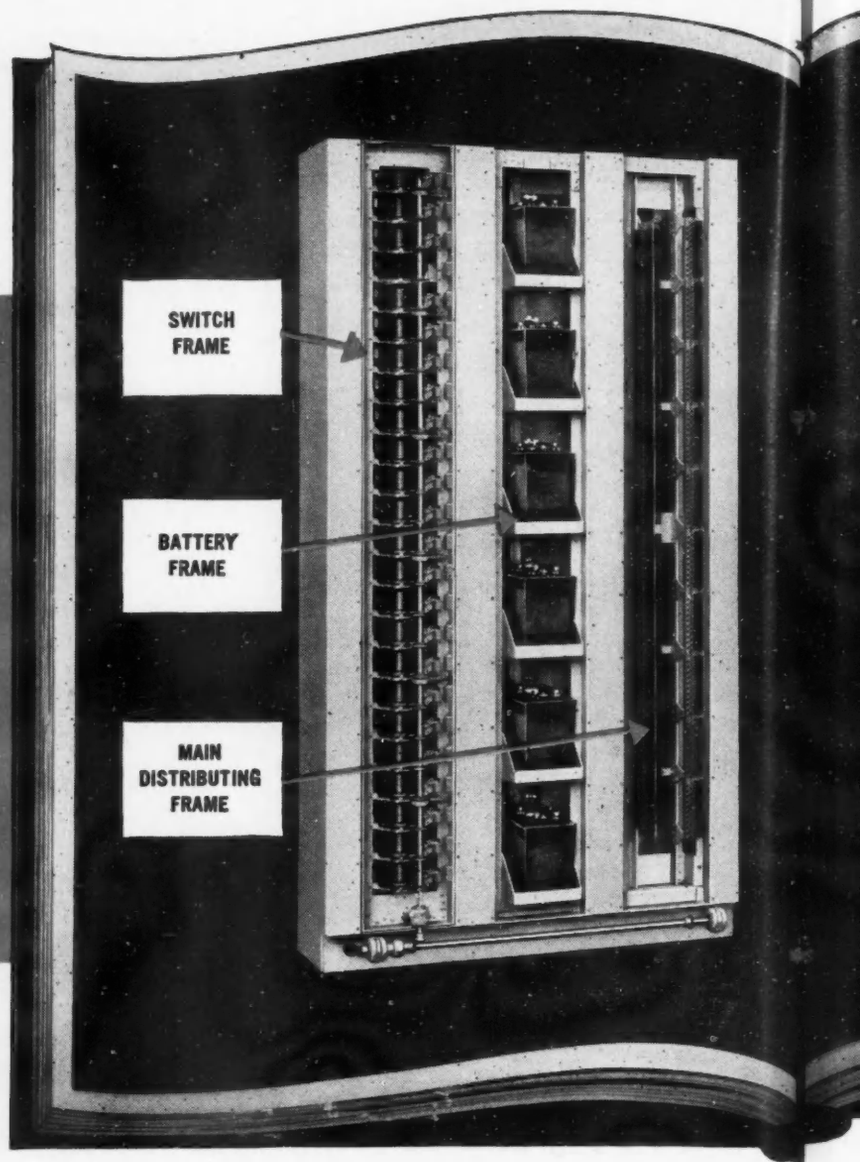
"STILL IN THE LEAD"

Distributed by AUTOMATIC ELECTRIC SALES CORPORATION . . . STROMBERG-CARLSON COMPANY

This is it!

A complete 100-line exchange that occupies only 24" by 56" of floor space!



Switch side of completely self-contained 100-line CRX.

CHECK THESE NEW ADVANTAGES

Federal's new CRX represents a significant advance in the art of automatic telephone switching—for it is the first equipment of its kind which is simple enough to be produced in *quantity*, at *minimum cost*. Never before has the telephone industry been offered automatic switching equipment with all these advantages:

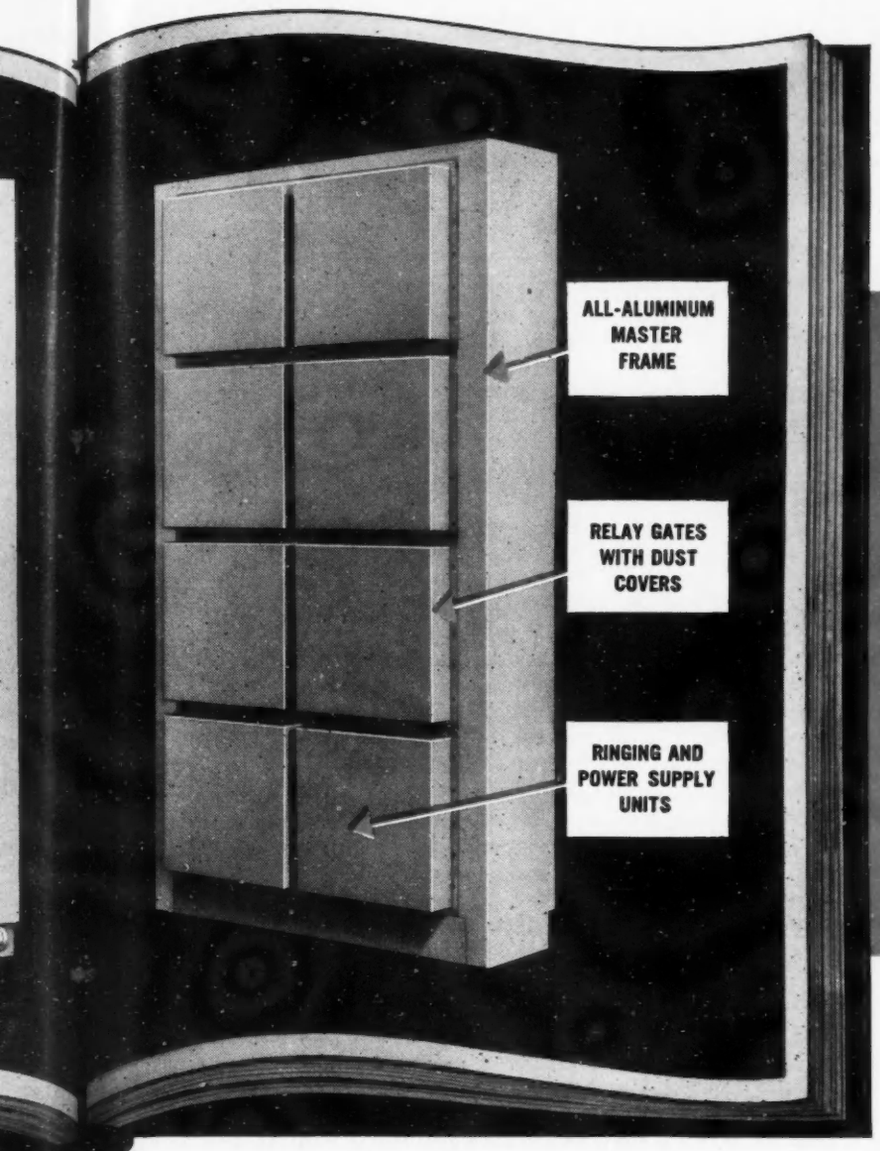
- ✓ **Simplified Construction**
- ✓ **Low-Cost Installation**
- ✓ **Flexibility of Operation**
- ✓ **Simplicity of Extension**
- ✓ **Ease of Maintenance**
- ✓ **New Dependability and Performance**

INTERCHANGEABLE UNITS!

Switch frame, battery frame and distributing frame are all interchangeable—as are all relay gates, which include relay mounting plates, ringing and power supply units. This allows complete flexibility of arrangement to meet individual requirements—permits equipment to be supplied for operation at partial capacity without bulky and costly wiring assemblies to provide for additional lines or links. Standard components can be easily installed and wired to meet system expansion. All installation work can be done by the normally-trained maintenance man.

Federal

KEEPING FEDERAL YEARS AHEAD... is IT&T's world-wide research and engineering organization, of which the Federal Telecommunication Laboratories, Nutley, N. J., is a unit.



FEDERAL'S NEW CRX

The Community Rotary Exchange that can revolutionize your telephone service

... and make it pay!

Relay-gate side, showing hinged gates with removable covers.

COMPLETELY SELF-CONTAINED!

The new CRX is shipped completely wired, ready to connect to the power source and to cable distribution plant. The 100-line exchange is complete with built-in battery rack, full float automatic power equipment and electronic 5-frequency ringing and tone generator.

NO CABLE FORMS!

A unique arrangement of the master frame and components permits all connections to be made directly to the equipment—utilizing small plastic cables—eliminates thousands of the soldered connections which increase costs and are potential trouble points with conventional cable forms and terminal blocks.

SEPARATE TOLL AND LOCAL LINKS!

New circuit arrangement provides for segregation of toll and local traffic—each has its own completely independent link facilities. No more loss of toll revenue due to engagement of all links by local traffic.

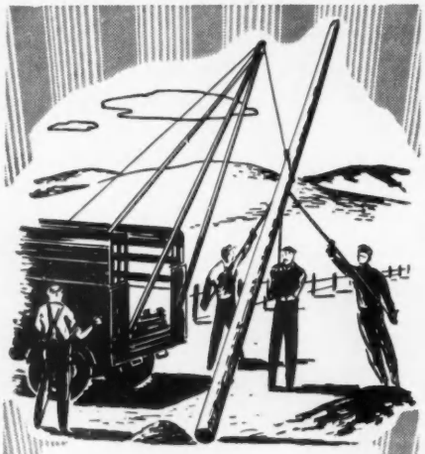
ALL-ALUMINUM FRAME!

Master frame, relay gates and relay mounting plates are all constructed of high-strength light-weight aluminum —for greater economy of manufacture, ease of handling and installation, lifetime resistance to corrosion. This compact, light-weight equipment permits appreciable economies in building construction.

Telephone and Radio Corporation

100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: — Federal Electric Manufacturing Company, Ltd., Montreal.
Export Distributors: — International Standard Electric Corp., 67 Broad St., N. Y. C.



Better
POLE PROTECTION
by Every Standard

Today, alert buyers in increasing numbers specify Chapman "Penta" Preservative treatment for wooden line materials. That's because this modern wood preservative has proved so satisfactory on *all* counts.

"Penta" Preservative, by actual test, provides unsurpassed protection against rot and insect damage.

Wood treated with "Penta" Preservative is practically odorless and clean to handle. That makes it favored by installation and maintenance crews.

Finally, regular treating plant methods and equipment are used to apply "Penta" Preservative. Most progressive plants use it now — all can get it for you quickly.

The complete, interesting story on Chapman "Penta" Preservative is yours for the asking. Write for details today.

CHAPMAN

CHAPMAN CHEMICAL COMPANY
Suite 540
333 N. Michigan Ave., Chicago 1, Ill.

"Penta" Preservative contains *Pentachlorphenol*, a product of *The Dow Chemical Company.*

INDIANA Commission Engineer Discusses RATE REGULATIONS

ONE OF THE most constructive and thoughtful analyses of the paramount requirement of adequate and fair rates for telephone companies to render the best possible service to subscribers and to maintain continuous technological improvements was presented June 12 at the 25th annual convention of the State Utility Commission Engineers, Madison, Wis., by William E. Roby, senior engineer of the Indiana Public Service Commission.

Pointing out that there has been generally a consistent downward trend in the real price of telephone service compared to real wages and to the costs of other commodities and services, Mr. Roby in his report entitled "History and Development of Plant and Rates of the Telephone Industry," stated that the current increases in costs of labor and materials are most important factors affecting telephone rates and rises in rates are predicated on these costs fairly and justly from the standpoint of the public.

"Rates cannot be made in a vacuum," Mr. Roby emphasized. "They must continually be adjusted not only to the change in services and the changing interests of the community, but to the general level of prices." Since World War II has started another cycle of a definite shift in the relationships of prices and in the value of the dollar, he stated that "just as prices for practically everything have risen in recent years so has the cost of providing telephone service." Stressing that the costs of labor have risen substantially in every industrial field, he noted that "as we all know wages account for a higher percentage of operating costs in the telephone business than in most others."

"Today the telephone is recognized as a potent economic and social force and it has grown from a toy and a luxury to a necessity in business and to a vital part of community life," Mr. Roby stated. He declared that just as technology in the laboratory has made possible the equipment to extend the two simple telephones of Alexander Graham Bell in the first public Centennial Exposition demonstration 71 years ago into a worldwide system, so "the growth and development of equitable rates has brought about the extension of these services and the utilization of the improvements made through research.

"Had there been burdensome regulation, this vast network of service would have been impossible," Mr. Roby drove home. "Wise regulation should continue to recognize that the apparent conflicts of interest between the investor and the user of telephone service are in reality NOT conflicts at all. Without a sound economic foundation no telephone company can continue to improve the service, to extend it, and to bring into being new techniques and new devices. No telephone business can be sound without just and fair rates. A reasonable rate to the consumer and to the investor is one which brings the cost of the service within the range of value to the user and at the same time safeguards investment.

"Rate structures may not subordinate the interests of the consumer to the interests of the investor any more than it may ignore the legitimate interests of investors in a zeal for protecting consumers."

In the current period of readjustment of prices, a review of telephone rates is an inevitable part, Mr. Roby stated. Telephone rates which ultimately grow out of present conditions should be geared to the needs of the community and to the interests of investors and of users of the service, he cited. He felt that maladjustment of prices does not persist for any prolonged period and eventually equilibrium is restored.

"If those who are responsible for the regulation of telephone rates recognize their responsibility and weigh all of these factors I believe the telephone industry will continue to put into effect rates which will best serve to advance the service to make it more useful and to broaden the scope," he stated. "The inevitable result will be a greater stimulation of trade through greater utilization of this still new means of communication."

◆

Increased Rates for Wolverton, Minn.

The Wolverton (Minn.) Telephone Company has been granted authority to change its schedule of rates and charges at Wolverton.

The Wolverton company serves approximately 48 local, 74 rural and 16 service stations.

Suppliers' News Briefs

(Continued from page 73)

tional activities relating to that equipment. In the meantime, rapid progress is being made in the work of tooling up for manufacture of the equipment, which provides business, industrial and service organizations with facilities for the high-speed transmission of printed matter, charts, photographs and other graphic material over wire or radio communication circuits. The equipment is being offered not only to business organizations, but also to Independent telephone companies as a means of expanding their services to customers to embrace these modern techniques.

Long experience in the field of telegraph and teletype sales and engineering gives Mr. Regel an admirable background for the discharge of his new duties. In 1922, after basic training in electrical engineering and radio, he joined the Postal Telegraph Cable Company for whom he served in managerial positions in several cities in the middle west, including the position of City Superintendent at Des Moines, where he had complete charge of traffic and commercial activities.

Later Mr. Regel was appointed agency supervisor for the Postal company in charge of telegraph promotion among Independent telephone companies. In this position, he negotiated with large telegraph users for the installation of teletype machines, and trained their personnel in the operation of the equipment. In this manner, he acquired a thorough knowledge of promotional technique for telegraph and teletype service.

Leaving the Postal organization in 1941, Mr. Regel entered the employ of Automatic Electric Sales Corporation as industrial salesman. During the war he became government contract service manager, continuing in that position until his appointment as executive assistant to the president.

◆

R. B. Carland Advanced To New Post by U. S. Rubber

Richard B. Carland has been appointed sales promotion manager of the wire and cable department of United States Rubber Company, with headquarters in the company's general offices, 1230 Avenue of the Americas, New York City.

(Please turn to page 80)

. . . with Amertel

Amertel offers the right combination of qualities to make it the outstanding choice of telephone men. They know they're **"Off To A Good Start"** when they select Amertel for their construction needs.

Amertel wire is manufactured under strict supervision to assure utmost satisfaction and quality. Its extra strength makes longer spans possible . . . withstands heavier ice and wind loads with resultant savings in maintenance and construction costs. Special galvanizing process assures greater resistance to corrosion and long, trouble-free service on the job.

Amertel wire is made in a wide variety of types for regular or long span construction.

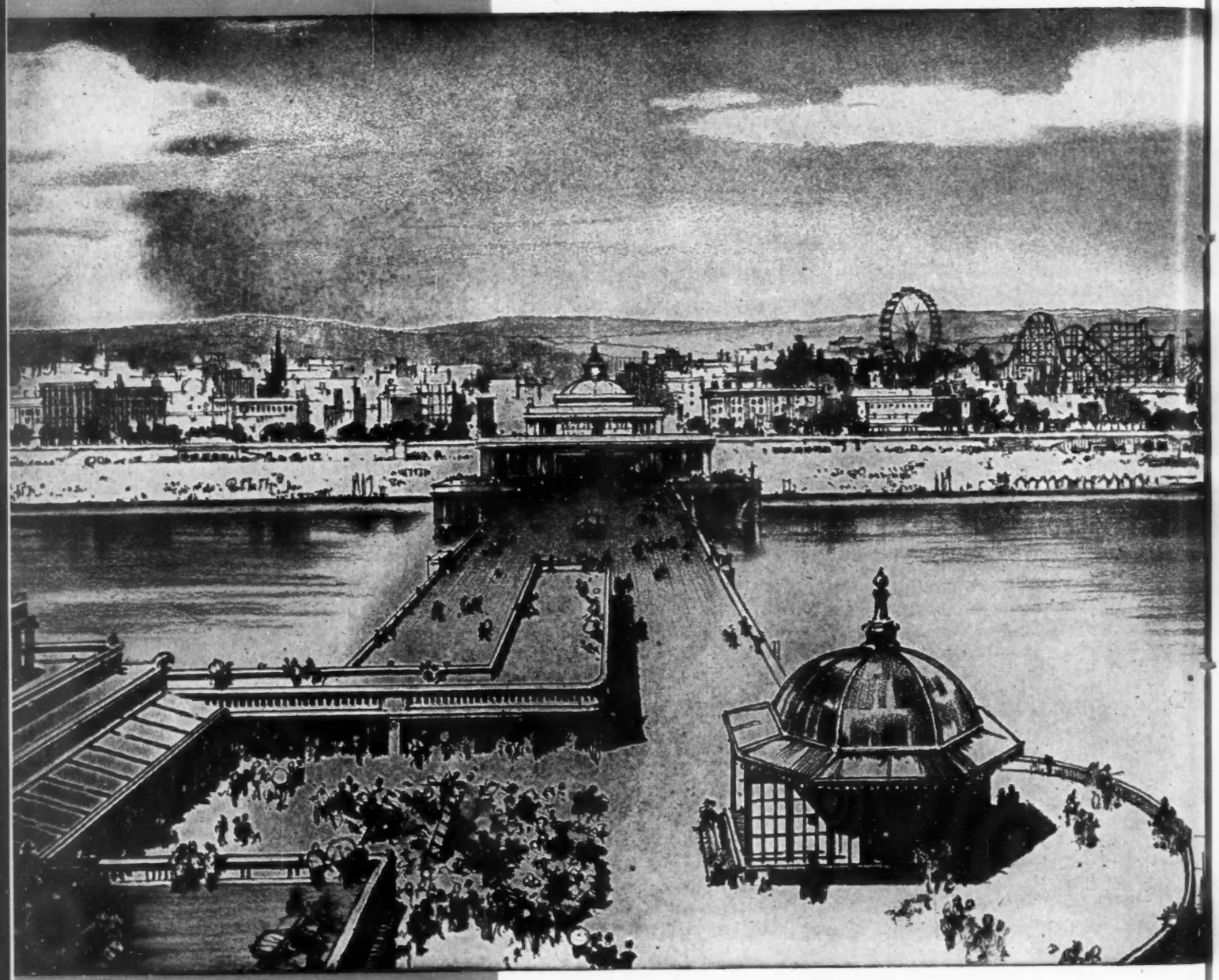
USS Amertel TELEPHONE AND TELEGRAPH WIRE AMERICAN STEEL & WIRE COMPANY

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

1033 WEST VAN BUREN STREET · CHICAGO 7, ILLINOIS

LINK THE WORLD'S



In the Holiday Resorts with

STROWGER

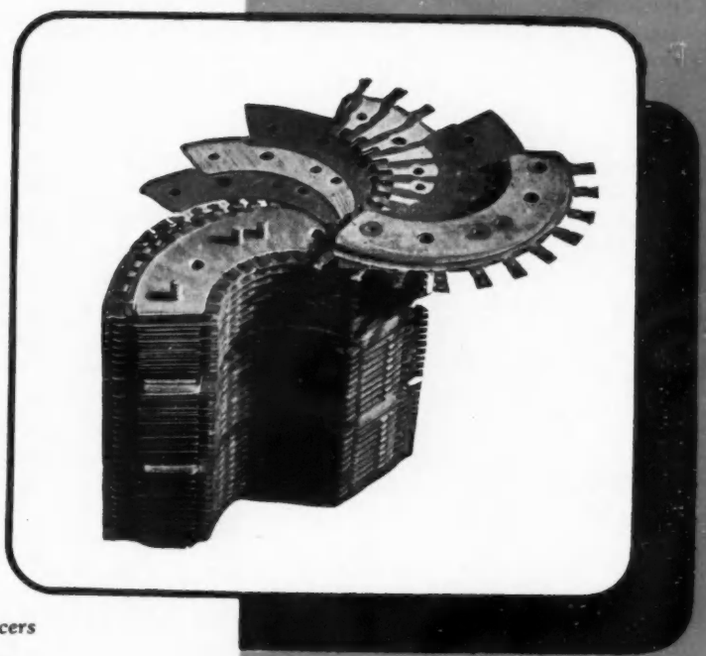
TELECOMMUNICATIONS

STROWGER WORKS

A7713-A2(L)

RESOURCES . .

The high tempo of modern business life demands that those who work must play. To amuse them, house them and cater for them other people must work and thus a huge business is built up—the Holiday Industry, with one feature peculiarly its own. The activities of a holiday town are seasonal and the promenades, beaches and gardens which are thronged at one period of the year may be almost deserted at another. Upon the efficiency of telephone communications the earning capacity of the town greatly depends and the service provided must therefore be economically capable of a similar variation from intense activity to comparative inactivity. Strowger Automatic Telephone Equipment possesses great flexibility in both operating characteristics and physical construction. Its design is such that only the minimum amount of equipment need be installed, yet even periods of heavy "peak" traffic can be handled without difficulty. Elimination of human operators means that there are no employment problems due to seasonal fluctuations, nor are there high salary overheads to be carried when decreases occur in the call rate. Strowger Automatic Exchanges can be provided for any number of subscribers' lines and are capable of rapid extension as the need arises.



The Strowger Contact Bank . . .

1. *It is specially constructed to prevent difficulties arising through warping or expansion of material.*
2. *It consists of ten double layers of contacts set radially, each layer having eleven separate and insulated contacts.*
3. *The Bank contacts are arranged radially so that switch wipers need travel only a short distance between contacts.*
4. *Each level of contacts is mounted in one fan-shaped piece to facilitate assembly and alignment after which one shearing operation segregates the contacts.*
5. *Phenol fibre insulators are used.*
6. *Levels are screened each from the next by aluminium spacers bonded and connected to earth.*
7. *Levels are arranged with only .015" allowance between them.*
8. *Contacts are made of brass and have burnished wiper ends.*

AUTOMATIC TELEPHONE & ELECTRIC COMPANY LIMITED

EXPORT DEPARTMENT

NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

LIVERPOOL 7, ENGLAND

A7113-42(R)

Suppliers' News Briefs

(Continued from page 77)

Mr. Carland was formerly in the sales promotion department of the company's mechanical goods division. He has been engaged in advertising and promotion work since 1939. From February 1945 to February 1946 he had a leave of absence from the rubber company to serve in Egypt and Iran as field director for American Red Cross.

Mr. Carland is a native of Nutley, N. J. He attended Bowdoin College, Brunswick, Maine. His present home is 40 Erie Place, Nutley.

◆

American Relay & Controls Expands Facilities

American Relay and Controls, Inc., have moved into larger quarters at 2555 Diversey Avenue, Chicago, and are operating with expanded facilities. Specializing in telephone type relays, they have announced that the complete line is now available, which includes three different sizes: the long telephone type; the intermediate size; and the miniature size. These units are obtainable in a variety of contact combinations for either AC or DC operation.

The company's engineering department is staffed with a full complement of highly trained, long experienced electro-mechanical engineers who assist American Relay customers with designing problems incorporating relay application.

◆

Fingertip Data Book On Solderless Wiring

Compiled for design and production engineers, Aircraft-Marine Products Inc. has announced an unusual selection data book on their entire line of solderless wiring devices. This attractive, plastic-bound volume displays the various types of solderless terminals, their features and their applications in a series of concise, informative, illustrated charts, index-tabbed for quick reference.

Of special interest are the descriptions, complete with photomicrogaphs, of the types of pressure "crimps" developed by the company for installing solderless terminals in a variety of wiring applications. Other noteworthy features are a graphic terminal selector chart and actual samples of the various solderless terminals manufactured by the company.

A copy of this data book may be obtained by writing to Aircraft-Marine Products Inc. 1627 North 4th Street, Harrisburg, Pa.

◆

Kenneth J. Johnson of Lincoln, Neb., has been appointed to the Stromberg-Carlson telephone sales staff. His territory assignment is Nebraska, Wyoming, Colorado, and Northern Kansas, according to announcement by T. C. (Tommy) Thompson, telephone sales manager.

Associated Research, Inc., Announces New Representative

Associated Research, Incorporated, manufacturers of the Vibrotest, Vibroground and Hypot, have announced the appointment of Conrad Bangh, 503 Sunderland Blvd., Omaha 2, Nebraska, to handle its products. Mr. Bangh's territory will consist of Nebraska, and all of Iowa except the counties of Dubuque, Jackson, Clinton, Scott, Muskatine, Mouisa and Des Moines.

◆

New Dillon Bulletin on Gauge for "Tight" Spots

Today, the requirement is universal for accurate indication of pressures, or working loads in mechanical assemblies. Points of inaccessibility in many setups have heretofore posed problems.

An interestingly illustrated Bulletin, shows how these problems are now solved by the new Dillon Mechanical Pressure Gauge, latest product of W. C. Dillon & Co., Inc., 5410 West Harrison St., Chicago 44, Ill., makers of a comprehensive line of testing instruments, dynamometers, etc.

Photographs of the Gauge and applications show it to be a fine example of simplicity. A jeweled dial indicator is mounted to a V-shaped pressure bar. When load is applied to the bar on anvils at its center, the indicator measures the exact amount of deformation, and translates it directly into pounds pressure. It checks accuracy of Brinell hardness testers, or hydraulic presses—operating pressures between spot weld electrodes—spring pressures (as in automobile clutch)—accuracy of compression instruments —moving filaments (ideal for wire, nylon, thread, gloss strand, etc.) It has literally thousands of uses. It works equally well with static or moving loads—may be calibrated in kilos—is furnished in sizes from 3⅝" x 2 7/32" x 1 ¾", to 4 5⅝" x 2 ⅜" x 2 ¾", in ranges for 0-100 to 0-5000 lbs. The new Bulletin may be had by addressing the manufacturer.

◆

Buckingham Announces Tree Surgeon's Safety Belt

The Buckingham Manufacturing Co., Binghampton, N. Y., has announced its No. 1302 and No. 1301 Tree Surgeon's Safety Belt which is described as providing the best insurance of life and limb on any hazardous tree job.

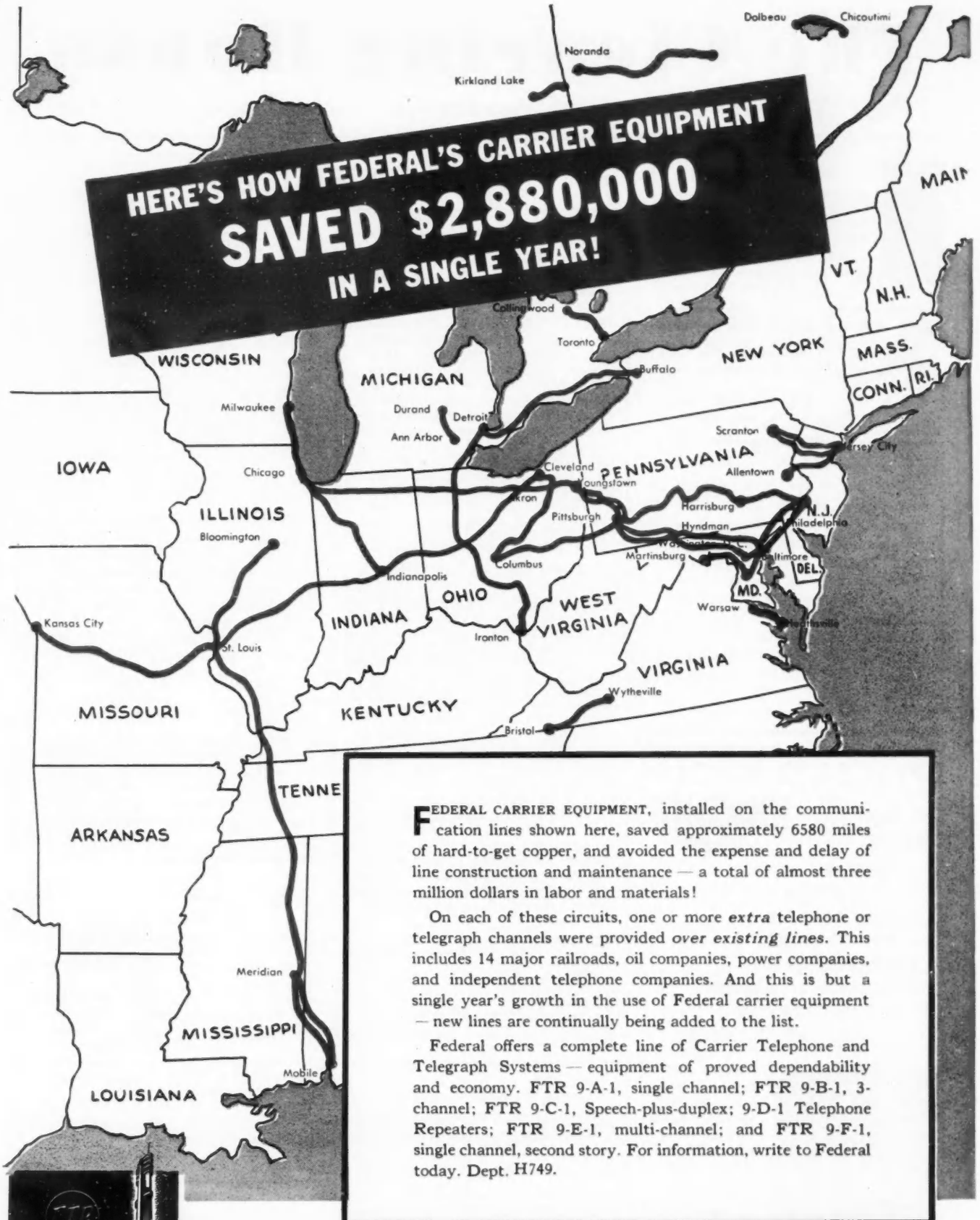
Convenient to use, and providing ease and comfort for the man on the job the 1302 belt is made of 4-ply cotton webbing, moisture proofed and mildew treated, securely stitched and riveted. The broad webbing of the saddle and back is faced with leather for extra comfort and durability. Saddle is fitted with forged D-rings for sling, and belt is equipped with both a ring and snap-fastener for carrying tools and accessories. The belt is built to Buckingham's rigid quality specifications; tested for strength and safety.

Buckingham's No. 1301 Tree Surgeon's Safety Belt is identical to belt No. 1302 (described above) but saddle and back are not leather-lined.

◆

Holub Industries Announces Plastic Clamp Supports

The Holub Industries, Inc., Sycamore, Ill., have announced the Holub Clamp Support, a departure and improvement over metal supports or hangers, designed for mounting wires, cables, tubes, pipes, rods, hose, etc.



FEDERAL CARRIER EQUIPMENT, installed on the communication lines shown here, saved approximately 6580 miles of hard-to-get copper, and avoided the expense and delay of line construction and maintenance — a total of almost three million dollars in labor and materials!

On each of these circuits, one or more *extra* telephone or telegraph channels were provided *over existing lines*. This includes 14 major railroads, oil companies, power companies, and independent telephone companies. And this is but a single year's growth in the use of Federal carrier equipment — new lines are continually being added to the list.

Federal offers a complete line of Carrier Telephone and Telegraph Systems — equipment of proved dependability and economy. FTR 9-A-1, single channel; FTR 9-B-1, 3-channel; FTR 9-C-1, Speech-plus-duplex; 9-D-1 Telephone Repeaters; FTR 9-E-1, multi-channel; and FTR 9-F-1, single channel, second story. For information, write to Federal today. Dept. H749.

KEEPING FEDERAL YEARS AHEAD... is IT&T's world-wide research and engineering organization, of which the Federal Telecommunication Laboratories, Nutley, N. J., is a unit.

Federal Telephone and Radio Corporation

100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: — Federal Electric Manufacturing Company, Ltd., Montreal.
Export Distributors: — International Standard Electric Corp., 67 Broad St., N. Y. C.

The Clearing House

For the Convenience of readers of Telephone Engineer

Chemical Dehydrators

Automatically controlled, using flake calcium chloride for preventing dampness and condensation in automatic totally enclosed telephone exchanges.

The H. J. Kaufman Co.
13215 Roselawn Ave., Detroit 4, Mich

One-man SALLY SAW portable
Gasoline motor. Falls and cuts up. Wghs. 63 lbs. Free Folder
Your farm implement dealer or write—
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CUMMINGS MACHINE WORKS Boston 10, Mass.

The rates for this department are as follows: 10c a word, cash with order, please. Box number service if desired. We Run Position Wanted Ads for Veterans Free of Charge. For display advertisements ask for rate card. Address all correspondence to: TELEPHONE ENGINEER PUBLISHING CORPORATION, 7720 Sheridan Road, Chicago 26, Illinois.

SPLICER'S TOOLS
Of Top Quality by UNIQUE

- FURNACES
- SOLDER POTS
- BLOW TORCHES
- WIPING CLOTHS
- BALANCED LADLES
- SOLDER IRON HANDLES
- THAWING TORCHES
- FOLDING SAFETY SHIELDS

Protect Public, Splicer, and Furnace. No. 50 C Shield shown here. Of 20 Ga. galvanized steel. Reinforced edges. 23"x17" x17". No. 50—four-sided with grate. No. 50 A—same without grate.

Your Jobber Has These Tools

UNIQUE MANUFACTURING CO., INC.
221 W. Walton St., Chicago 10, Ill.

CLASSIFIED ADS

Help Wanted

HELP WANTED: Position open for Plant Manager with ability and experience to take charge of group of one common battery and small North Automatic exchanges. Total stations 1300. A real position with adequate salary for a man with the know how and desire to work. Unless you are capable and ambitious don't apply. Good equipment and tools. This is your opportunity if you have what it takes. Salary will satisfy if you can qualify. Located in Texas. Box 8503, c/o Telephone Engineer & Management.

Position Wanted

VETERAN of World War I and II. Age 49. 17 yrs. experience inside and outside plant. 9 yrs. experience as Plant Wire Chief. Experienced on W. E., S-C, Kellogg, Leich and Strowger Automatic equipment. Prefer supervisory job on either inside or outside plant or telephone supply warehouse. Highest references and training. Write Box 8487, c/o Telephone Engineer.

Position Wanted

Position Wanted: Plant Superintendent or Field Engineer. Veteran, 5 years experience with Class "A" Telephone Company as Field Engineer. Commissioned in Signal Corps and served 1½ years with Heavy Construction Battalion as Construction Officer. Balance of service was performed as Communications Officer in Air Corps. Location anywhere in United States. Married, Age 27. Address Box No. 8496.

For Sale

FOR SALE: Rebuilt Common Battery Equipment. Western Electric No. 40-L Stands, Complete at $6.60 ea. No. 534A Ringer boxes, $4.50 ea. Extension Hand Set Phones, Desk or Wall, at $8.00 ea. Independent Telephone Repair Co., 1432 W. 15th St., Chicago, Illinois.

FOR SALE: Three position American Electric Magneto Switchboard, capacity 660 equipped 550, 45 cord circuits, transfers, lamp supervision. Good condition. United Telephone Company, Clinton, Missouri.

FOR SALE: Control in system of 470 phones; assets of $45,000 with 4 Toll line Circuits; want to sell control and home in which plant is located. W. E. Equipment. Kellogg Board. Box No. 8504.

Wanted to Buy

WANTED TO BUY: Exchange which can be bought with down payment of approximately $6,000. Condition not of prime importance as buyer is qualified telephone man. Would consider investment in business with employment. West of Mississippi. Wife is experienced in traffic and commercial. Veteran. Box No. 8500.

WANTED: 100 Amp. 24 Volt Divertor Pole Motor-Generator with Control Panel. 220 Volt Single Phase or 220 Volt 3 Phase. Virginia Telephone & Telegraph Co., Charlottesville, Virginia.

Wanted To Buy

WANTED: Automatic telephone systems and circuit engineer, senior grade and junior; permanent. Modern working conditions and employee benefits. Apply to Engineering Division, give background, experience, and personal data, Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Illinois.

WANTED: One position, Western Electric, 1200 type Magneto Switchboard. Give size, equipment, and price. Bohnsack Brothers Co., Germantown, New York.

DO YOU NEED "KNOW HOW" for a better job . . . do you want to catch up on developments in telephony today? For the answers to questions in general and your problems in particular, we recommend highly the books listed in this issue of TELEPHONE ENGINEER & MANAGEMENT.

Reconditioned Kellogg No. 2000 Type Relays

Spring Combinations

2002	2007	2023	2037	2064
2003	2019	2027	2043	2077
2004	2020	2029	2046	2089
2006	2021	2031	2048	2091

Coils

SB	SAD	SEK	TJ	CZ	CDM
SC	SAH	SEM	TX	CAA	CDP
SE	SAP	SEQ	TY	CAB	CDX
SF	SAQ	SFU	TAV	CAJ	CEA
SH	SBG	SGF	TAY	CBE	CEB
SJ	SBH	SGH	TBL	CBM	CEC
SL	SBX	SGJ	TBN	CBY	CEQ
SN	SDE	TB	TBQ	CCC	
SP	SDF	TC	TBU	CCD	
SU	SDG	TE	CB	CCG	
SW	SDT	TF	CU	CCN	
SAC	SEB	TG	CY	CCV	

Many other codes in smaller quantities. Complete relay assemblies, mountings and covers.

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Cedar Poles

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★ ★

Northern White and Western Red Cedar Poles—Plain or Butt-Treated

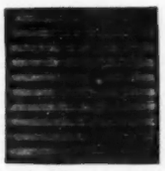
Write Today for Your Copy . .

Bashlin's new bulletin giving full details on Linemen's Safety Equipment is ready for you . . . a complete line from which to choose, and every one a champion. Write today!

W. M. BASHLIN CO. **Grove City 1, Pa.**

finishing cloths — catch cloths

CABLE-SPLICERS WIPING CLOTHS



Wipe Perfect Joints

on lead-sheathed cable splices

packed in cartons

sealed in wax paper wrappers

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3035 Aldrich Avenue So. Minneapolis 8, Minn.

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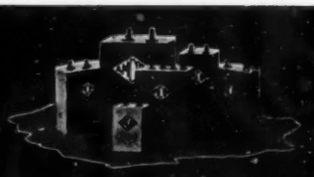
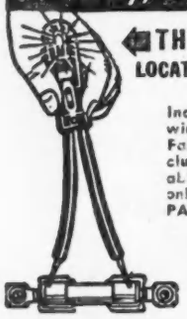


Test-O-Lite

TESTS ANY VOLTAGE...
100 to 550 Volts, A.C. or D.C.
Safely, Swiftly, Surely



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LOCATES TROUBLE INSTANTLY

Indicates hot or grounde wires. Tells AC from D Far superior to ordinar clumsy test bulb Indisper able in shop or home. T only pocket-size tester wi PATENTED SAFETY FEATUR

Life-time guarantee. Purchase thru electrical dealers.
Pat. No. 1,778,883.

RTC-2 VINCENT RARE GAS RELAY

for harmonic or coded bells. Dual purpose device which economically improves both ringing and transmission on party lines. NO MOVING PARTS. Fully guaranteed. Can be installed in a minute.

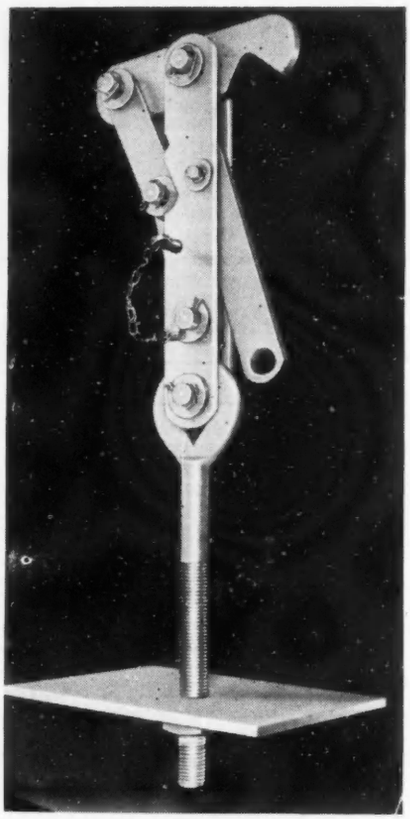
L. S. BRACH Mfg. Corp.

A. B. Chance Co. Introduces Safety Pole Unloader

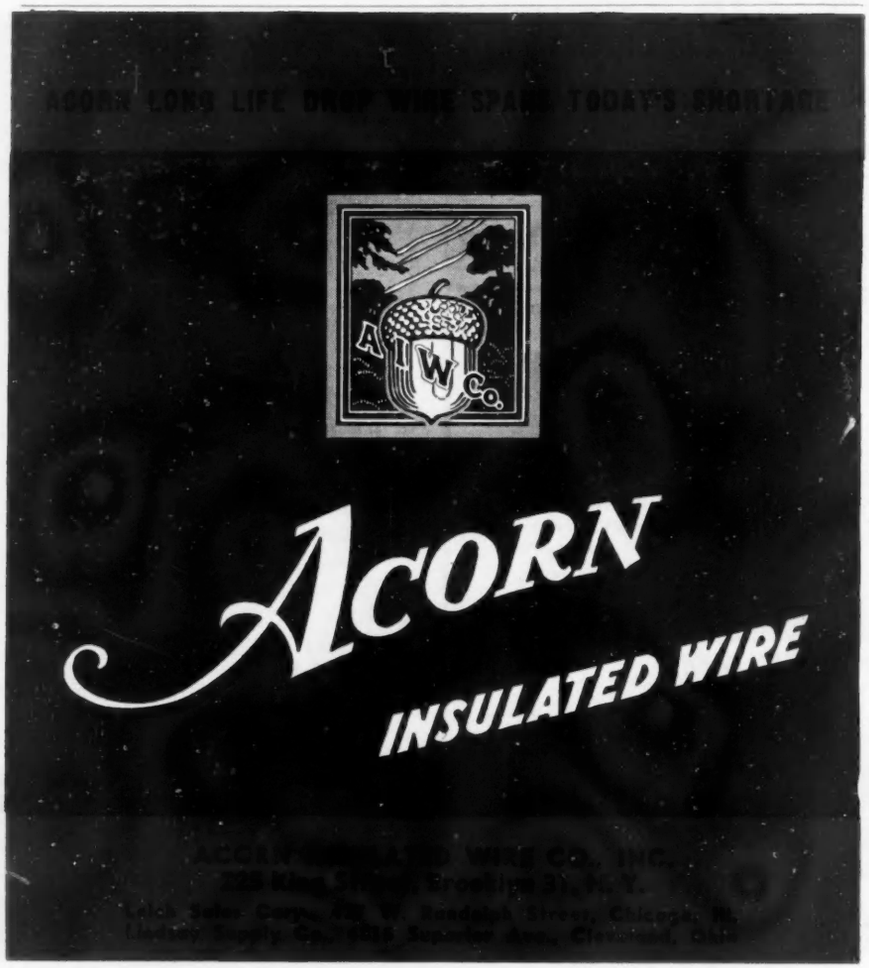
A new "Safety Trip" pole unloader that takes the danger out of a job which has often caused serious accidents is now manufactured by the A. B. Chance Company, Centralia, Missouri. The unit makes it possible for men unloading poles from flat cars to be at a safe distance when poles are released, and protects workmen making preparations.

The tripping device has a locking pin that prevents it from releasing while stakes and tie bands are removed and a toggle arrangement holds the load under strain until the trip is released by hand lines.

In applying the equipment, two safety trips are attached to empty stake sockets on the side of the car opposite the unloading area and cables attached to these trips are thrown over the load and attached to Thimbleye bolts which are secured to empty stake sockets on the other side. When the stakes are removed on the unloading side, a hand line is attached to the tripping device. A safety lock pin is removed and when all workmen are in the clear, the hand lines are pulled well beyond the end of the car thus the poles are released to roll down the skids.



New safety pole unloader developed by A. B. Chance Co.



U. S. Rubber To Substitute Aluminum For Copper

Because of the current copper shortage United States Rubber Company has announced that it will substitute aluminum for copper in some of its building wire and cable now going into production.

The insulated aluminum wire will be made in all sizes, as approved by Underwriters' Laboratories.

◆

Rochester (N. Y.) Telephone Co. Reelects Directors

At the annual stockholders' meeting of the Rochester (N. Y.) Telephone Corporation, these directors were reelected: Raymond N. Ball, John P. Boylan, Robert M. Bruce, M. Herbert Eisenhart, Bernard E. Finucane, Sol Heumann, Wolcott J. Humphrey, Gilbert J. C. McCurdy, John W. Morrison, T. Carl Nixon, John Craig Powers and Douglas C. Townson.

◆

Improvement Program For St. Louis, Mich.

Plans for improvement of service in St. Louis, Michigan, were outlined recently by B. C. Schweitzer, president of the Union Telephone Co., Owosso, Mich.

Installation of a new switchboard was started March 15.

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS
Managing Editor

NEW HORN SIGNAL . . .

DUE TO CUSTOMER demand for an audible signal to indicate incoming calls to mobile radio telephone units which can be heard if the car occupant is some distance from the vehicle an auxiliary horn signal has been developed for this purpose.

The signal makes use of the horn in the vehicle and a relay to activiate the car horn when the regular bell in the car operates. The customer will not want the horn to sound on incoming calls while he is in the car and a switch is provided so that the horn feature may be cut on or off.

The horn will sound only when the key is operated and the ringing signal is applied to the channel. This will result in only two short blasts of the horn at approximately 20-second intervals for each call.

• • •

MOVE TO THE SERVICE . . .

THE RURAL Electrification Administration has a new story concerning the Arkansas farmer who whipped the fact that he could not get power lines strung to his home by moving his home to the electric lines.

J. D. Murphree, living 14 miles south of Newport, Ark., applied for REA electric service, and was informed a shortage of materials made it impossible to extend the line one-half mile to his house.

So, the REA said, he put skids under his house, hitched on a tractor and moved it to the source of power.

• • •

DOWN TEXAS WAY . . .

TEXANS ALL love Texas, but even in that fabulous state not every one always loves every one else. Right now, according to a news clip, Houston and Dallas are batting each other over the head lustily on the subject of population, a condition brought on by a Dallas Chamber of Commerce estimate of population which showed Dallas practically breathing down Houston's neck in the population race, and a cinch for first place by 1950. The AP carried the story out of Dallas, and Houston spokesmen have been speaking plenty since, as well as registering a good healthy kick with the AP. Houston is still first by a wide margin, they say, and Dallas showed striking gains only by suddenly including a couple of populous suburbs in the corporate population figures.

It will take a population census, obviously, to really settle the matter. The only thing a non-Texan can add, and be sure of, is that both Houston and Dallas are surprisingly big places.

• • •

MORE ON JOBS . . .

FIFTY-SEVEN per cent of the workers interviewed by FORTUNE said they would choose a different occupation if they could start over again.

And the usual 8 to 5 they would have said the same thing about their wives.

• • •

RUSSIA LIKES COMMERCIALS . . .

UNLIKE AMERICANS, whose chronic complaint is commercials, Russians like radio advertising announcements.

At least, according to United Press reports received from Moscow, they listened eagerly to the first commercials broadcast there recently—and asked for more.

Muscovites, who heard no high-powered, musical tributes to the sponsor's product, greeted the matter-of-fact spot announcements for theaters, stores and factories as an information service. Neither subtle, nor coy, the Russian commercials are read—by men and women announcers—one after another during eight minutes reserved for advertisers, three times daily.

Everything you want right where you want it, in HIGHWAY MAINTENANCE BODIES

When seconds count, it's vital to have the right tools, the needed supplies, within fingertip reach. That's why field men appreciate Highway Maintenance Bodies. Planned for time-saving convenience, they provide instant access to everything needed out on the job. There's a place for every tool, ladder and piece of equipment, all in apple-pie order.

What's more, these Highway Bodies are built to stand the punishment that goes with maintenance service. You dish it out. They take it. Scientific weight distribution means perfect balance at all times.

Highway Bodies, like other Highway utility equipment, have been designed in close cooperation with leading engineers in the utility and communications fields. Write to us about Highway Earth Boring Machines, Winches, Power Take-offs, Derricks, Pole Trailers, Cable Reel Trailers, Splicer's Trailers. Your inquiry will receive immediate attention. No obligation.

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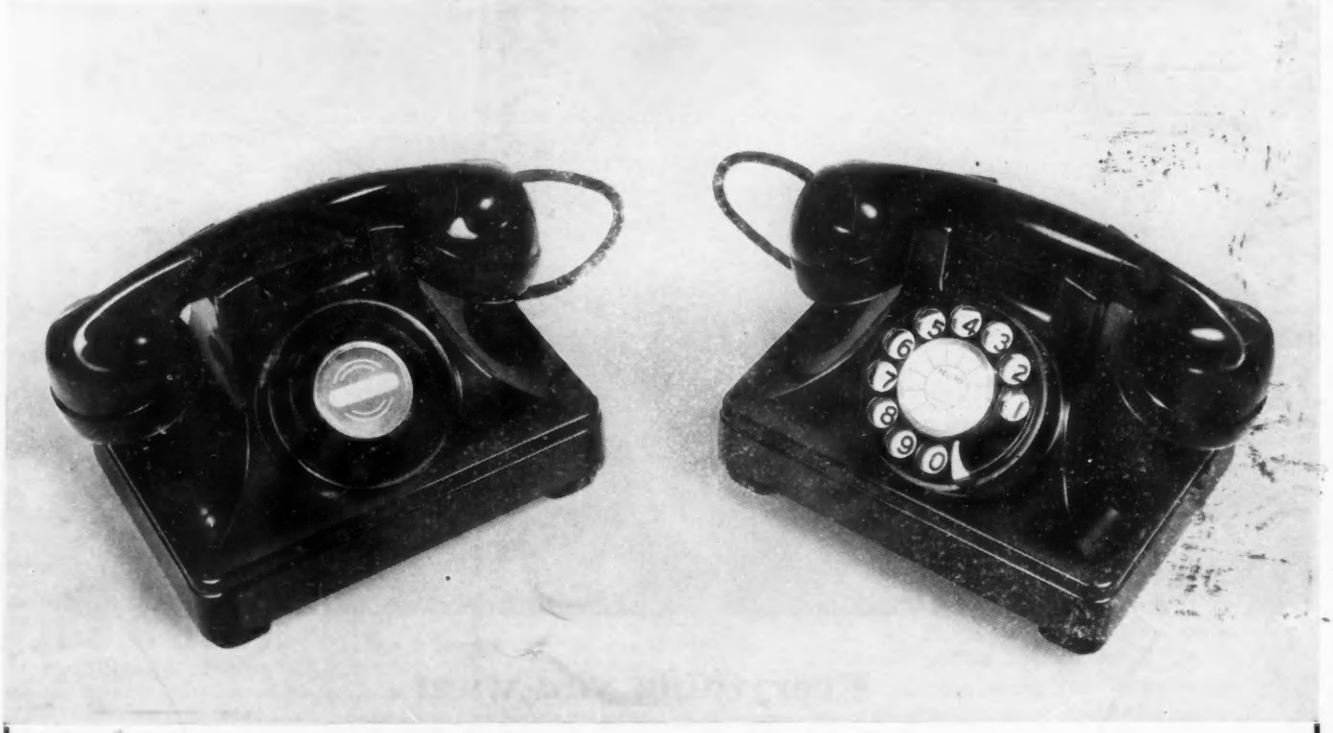

MODERNIZE NOW

Conversion from manual to dial is a must for the successful telephone operator.

Much is to be gained by starting your substation replacement program now, while you are completing plans for necessary equipment and outside plant changes.

The impatience of your subscribers will be lessened by the appearance, by the convenience, and by the outstanding performance of the modern compact handset telephone.

Start your program now and insert the dials when the date of conversion arrives.

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